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DIESEL PROGRESS

SEPTEMBER, 1941

OPEN PORTS-

Full Power!

LOOKING DOWN into cylinder No. 5 of a 1250-hp. Nordberg Diesel. Cylinder wall is mirror-like, *all ports are open.*

CHICAGO PNEUMATIC DIESEL. In the last 5 years' operation, down-time only 4 hrs. On Texaco Products for past 9 yrs.

EXHAUST PORTS that stay clear, complete scavenging, the assurance of full power and fuel economy . . . all can be yours, when you lubricate your Diesels with *TEXACO ALGOL or URSA OILS.*

Texaco Algol and Ursa Oils stubbornly resist the formation of gum, sludge, hard carbon. What little carbon forms is soft, fluffy . . . blows away harmlessly.

So many Diesel operators get these results that—

More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

The outstanding performance that has made Texaco FIRST in the stationary Diesel field, has made it FIRST also in the fields listed in the panel.

These Texaco users enjoy many benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

THEY PREFER TEXACO

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

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TEXACO

TEXACO Lubricants and Fuels

FOR ALL DIESEL ENGINES

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for National Defense.

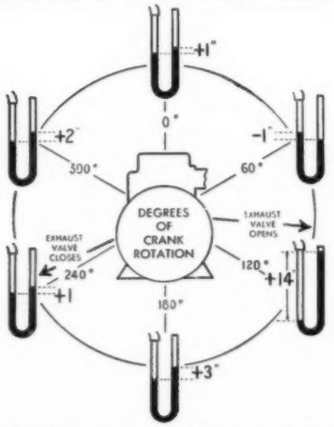
DIESEL PROGRESS for September, 1941. Volume VII, Number 9. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1934, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: United States and Possessions $3.00; Canada and all other countries $5.00 per year. Single copy price 25 cents in U. S. A., 50 cents for all other countries.

RGESS—ORIGINATORS OF SNUBBING PRINCIPLE FOR QUIETING DIESEL EXHAUSTS—BURGESS—ORIGINATO
COMPLETE SATISFACTION

BURGESS SNUBBER BULLETIN on Diesel Exhaust Noise Control

EXHAUST PRESSURES VARY WIDELY with CRANK ROTATION

Ordinary static manometers cannot indicate the true pressure conditions in a Diesel exhaust, because these pressures vary constantly throughout the engine cycle. The diagram below shows what a manometer would read if it could follow the pressure changes in the exhaust system as the crankshaft revolved. In this case, the test was made on a 2-cycle blower-scavenged engine equipped with a Burgess Snubber.



For other engines, while the readings would be different, similar wide pressure fluctuations would occur. Such readings can actually be made with a special type of sampling manometer, arranged so that the manometer is connected only momentarily to the exhaust line at a specific crank angle in each cycle.

When the exhaust valve opens—at approximately 94° from top dead center on this particular engine—exhaust pressure goes from a —1" to +14" of mercury in a fraction of a second, while the crankshaft revolves only 30°. During the time the shaft has revolved 60° more, exhaust pressure drops below zero and then climbs back up to 3". After that the pressure remains mostly above atmospheric, becoming rather steady after the exhaust valve closes. If this engine were not equipped with a Snubber, extreme fluctuations would continue to occur.

Since it is the wide and rapid fluctuations in the exhaust system which cause exhaust noise and may cause improper scavenging, it is clear that only by smoothing out pressure peaks can a quiet Diesel exhaust be obtained.

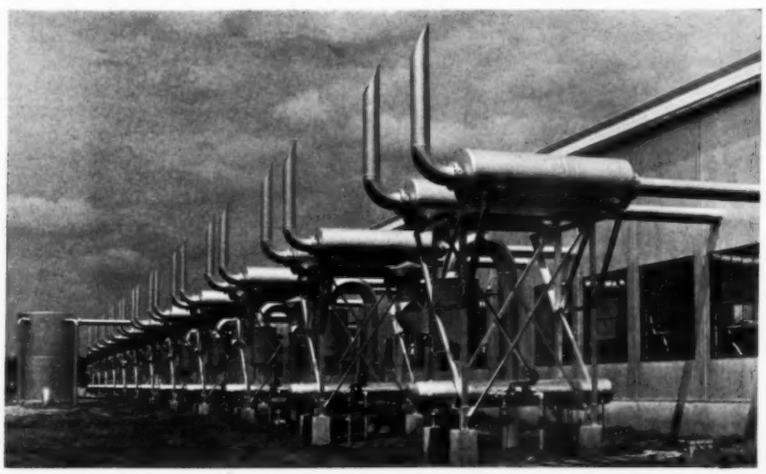
The Burgess Exhaust Snubber is therefore designed to "snub," or check, the high velocity exhaust slugs and, at the same time, iron out pressure fluctuations without causing harmful restriction of flow.

This type of test reveals that the average pressure reading of an ordinary manometer, attached to the exhaust line, gives no adequate indication of the effect of a Snubber on the engine's performance. One sure way to determine that the Snubber is not impairing engine performance, while effectively quieting the exhaust, is to make sure that exhaust temperatures, fuel consumption, and horsepower of the engine are normal. If so, the Snubber is operating correctly, irrespective of static manometer indications.

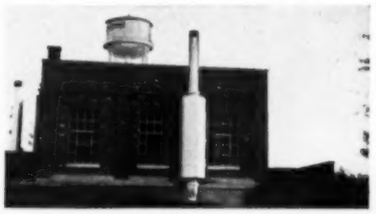
★ ★ ★

Twenty-four Snubbers at Cotton Valley, La.

The Cotton Valley Recycling Plant for the unitization and pressure maintenance of oil fields at Webster Parish, La., is the first major effort to conserve oil supplies by a large group of independent operators, 30 in all. The largest plant of its kind in the country, it embodies the finest equipment throughout. Burgess Snubbers were installed on the 12 Clark gas engines driving large angle compressors, two to an engine. These Snubbers assure quiet exhausts with efficient, economical operation.



Snubbers provide quiet exhausts at Cotton Valley Recycling Plant.



SNUBBERS PREVENT EXHAUST NOISE
at hundreds of municipal plants like this station at Carmi, Illinois. The engine is a Fairbanks-Morse 1,050 hp Diesel unit.

★ ★ ★

Use Smooth Pipe between Engine and Snubber to Avoid Added Noise

If the pipe used between engine and Snubber has projections or roughness on the inside, considerable noise will be caused. This "exhaust pipe noise" will be heard right in the engine room, coming from the pipe. The solution is to use pipe with a smooth interior to insure a quick and easy passage of all exhaust gases to the Snubber. Once the exhaust gases pass through the Snubber, their flow is smoothed sufficiently so that the type of tail pipe makes no difference.

★ ★ ★

One Manufacturer Says—

VENN-SEVERIN MACHINE CO.
1517-1527 WEST NORTH AVENUE
CHICAGO
U.S.A.

May 10, 1941

Burgess Battery Co., Acoustic Div.
508 W. Huron St., Chicago, Ill.

Gentlemen:

We are indeed pleased to report that Mr. Rabestrow of Mechanicsburg, Pa. recently wrote us expressing his entire satisfaction as to the operation of his Venn-Severin Diesel plant there, as you will recall, we had some difficulty with exhaust noise some time ago.

To say the least, Mr. Rabestrow is pleased with the performance of the new mufflers.

We wish to express our sincere appreciation and thanks for your splendid cooperation in this particular case and assure you it will earn many dividends in the future.

Sincerely,
VENN-SEVERIN MACHINE COMPANY,
V. H. Venn.

TH:ik

This is another example of the satisfaction Burgess Snubbers are giving Diesel engine users all over the country. Many engine manufacturers, like the above, appreciate the engineering cooperation offered by Burgess and specify Burgess Snubbers to be sure of quiet exhausts on their engines in all types of installations.

Published by Acoustic Division, BURGESS BATTERY COMPANY—502 W. Huron Street, Chicago, U. S. A.

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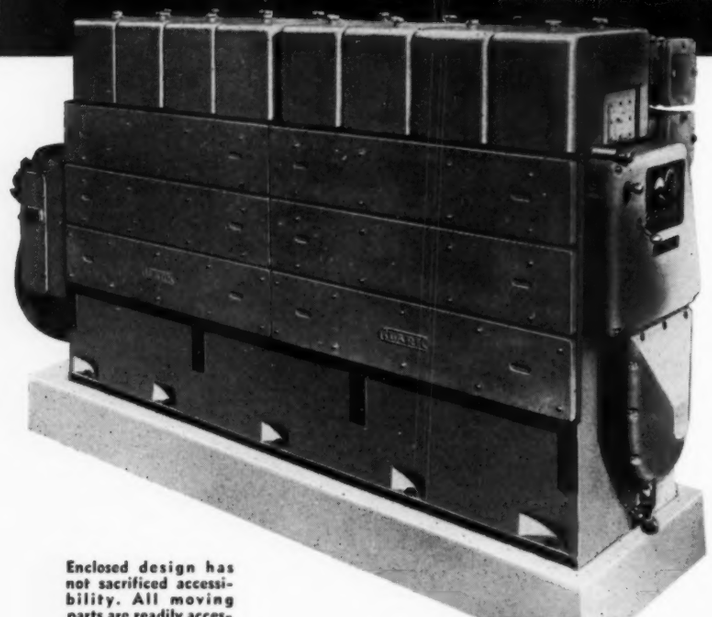
RGESS—ORIGINATORS OF SNUBBING PRINCIPLE FOR QUIETING DIESEL EXHAUSTS—BURGESS—ORIGINATO
COMPLETE SATISFACTION IN EXHAUST AND INTAKE QUIETING—SPECIFY BURGESS SNUBBERS—FOR COMPLE

CLARK CONVERTIBLE GAS-DIESEL ENGINES

and Engine-Driven Compressors

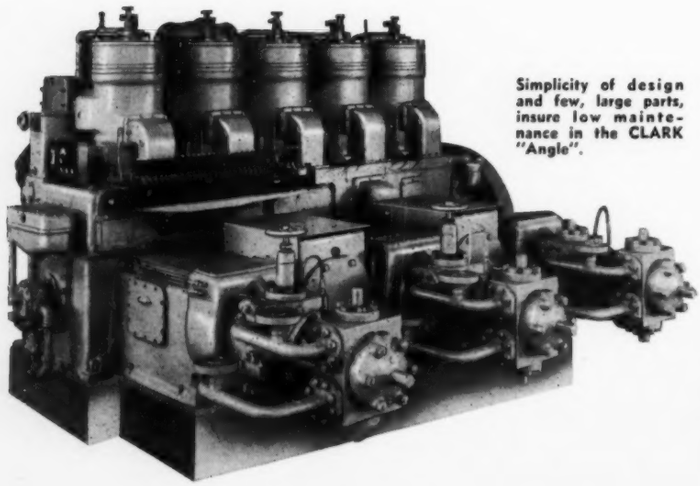


Enclosed design has not sacrificed accessibility. All moving parts are readily accessible.

CLARK MODEL F CONVERTIBLE 4-CYCLE ENGINE, built in 3, 4, 6 and 8-cylinder sizes, is an exceptionally clean design, all parts being enclosed in oil-tight covers. Fuel pump and fuel lines are isolated so that fuel cannot contaminate the lube oil. Special features are the patented "Cetane Selector" which permits adjusting the timing of the fuel pumps with engine in operation, to secure maximum efficiency for the type of fuel being used. — CLARK-designed oil-cooled pistons, — and full force-feed lubrication to all bearings and valve gearing, including overhead tappets and rocker-arm bearings. Complete mixing of the air and fuel results from a combination of air swirl induced by the inlet valve, plus controlled turbulence due to special piston crown design.

Used as a Diesel Engine range is from 150 to 535 H. P.; as a Gas Engine, from 150 to 600 H. P. The convertible engine has 10" bore, but this model is also offered with 11½" bore for operation as a straight gas engine.

CLARK SUPER-2-CYCLE CONVERTIBLE, popularly known as the CLARK "ANGLE", is a complete, compact engine-driven compressor. The power cylinders are arranged in a single vertical row and the compressor cylinders in a single horizontal row, with both power and compressor cylinders connected to the same crankcase. This arrangement has established a new high in overall efficiency for engine-driven compressors, of approximately 95%. Special features of the CLARK "Angle" are CLARK Super-2-Cycle fuel injection, which has made possible 2-cycle simplicity with fuel economy equal to the best 4-cycle engines, — CLARK-designed oil cooled pistons,—and full force-feed lubrication.



Simplicity of design and few, large parts, insure low maintenance in the CLARK "Angle".

The CLARK "Angle", in its four years on the market, has set a world record for compressor sales. Clark engineers will be glad to consult with you on your problems. Get in touch with us.

CLARK BROS. CO., INC., OLEAN, NEW YORK, U.S.A.

Export Offices: 30 Rockefeller Plaza, New York. Domestic Sales Offices and Warehouses: Tulsa, Okla.; Houston, Tex.; Chicago, Ill.; Boston, Mass. (131 Clarendon St.) West Coast Offices: Smith-Booth-Usher Co., Los Angeles, Cal. Foreign Offices: 72 Turnmill St., E. C. 1. London; 4 Str. General Poetas, Bucharest, Roumania.

CLARK

DIESEL and GAS ENGINE PROGRESS

REX W. WADMAN
Editor and Publisher

FRONT COVER ILLUSTRATION: A "Waltzing Matilda" coming down Ludgate Hill with St. Paul's Cathedral towering in the background in London, taken on August 1, 1941. Diesel engines increase the cruising range of tanks, decrease the fire hazard, and materially simplify the handling of fuel replacements in the field.—*Press Association, Inc., Photo.*

TABLE OF CONTENTS ILLUSTRATION: Fred A. Hill, Redlands, California, successfully using Caterpillar Diesel tractor to cultivate his orange groves. This tractor pulls a disk harrow over hard, dry ground and covers thirty acres in nine hours.

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HEYWORTH CAMPBELL
Art Director

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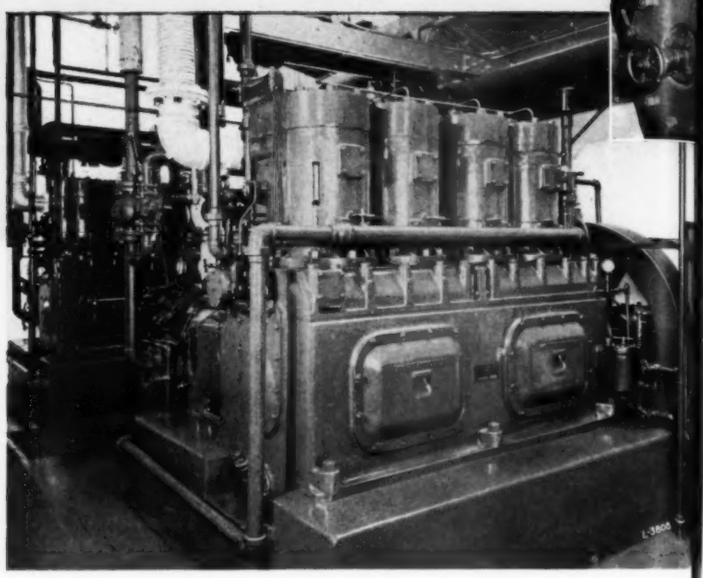
GAS ENGINES CUT CREAMERY COSTS

By JIM MEDFORD



Two of the Worthington gas engine compressor units. Note Pickering governor, extreme right, above flywheel.

PROGRESSIVE manufacturers located in the natural gas area of Southern California have displayed a steadily growing interest in the application of this low cost fuel to their production needs. Prominent among the most recent of these to repower its plant with modern gas engines is the Knudsen Creamery Company, of Los Angeles. This company has recently completed the installation of a third Worthington angle gas engine compressor, a Type LCE 6 cylinder, 11½" bore, 12" stroke, rated 225 hp. at 350 rpm., with three Worthington-Carbondale compressor cylinders, one 7¾" and two 8¾" bore, 12" stroke and double acting.

It all began back in July, 1938, prior to which all electric energy was purchased for refrigeration, power and lighting, but then the cold room load was only 67 tons daily. Demand for Knudsen dairy products was crowding the plant's refrigeration capacity and something had to be done about it. That "something" was the decision to change over to gas engines after ascertaining that by so doing the cost and installation of Worthington gas engines would be liquidated at the rate of one-sixth annually. This ratio has not been altered by the addition of the third Worthington unit. By mid-year of 1944, the entire cost of the $30,000 triple unit natural gas power plant will have been returned to the Knudsen treasury.

The original change-over from motor driven units was by installation of two Worthington LCE 4 cylinder, 11½" bore, 12" stroke, angle gas engines, rated at 150 hp. each at 350 rpm. While basically alike, each operates independent of the other, serving a definite purpose in the power hook-up.

Unit No. 1 serves in the dual capacity of supplying electric energy and handling part of the cold load. Through multiple V-belts power is transmitted to a 1200 rpm. constant speed 75 kva., 3 phase, 60 cycle, 240 volt generator with 2 kw. direct connected excitor, rated 60 kw. at 80% power factor.

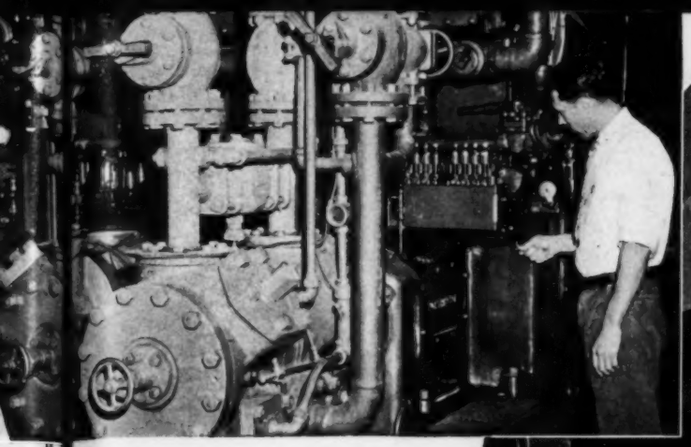
Though designed for two compressor cylinders, only one mounting is in service. This carries a 7¾" x 12" double acting Worthington-Carbondale cylinder rated 44 tons at 25 lbs. suction and 175 lbs. head pressure. In continuous 24 hour service because of the generator hook-up, the economy operation test logs an average of 9.5 cu. ft. natural gas fuel per bhp. hour, and ¾ gal. #1 lube oil for the 150 hp. output per 24 hours.

Unit No. 2 is for straight refrigeration service, its two compressor cylinders of different sizes, 7¾" x 12" and 9" x 12". It has a multiple V-belt power take-off for switching generator load from No. 1 when the unit is off the line for oil change or overhaul. This is made possible by installation of the third and larger unit which then takes over load, permitting the unloading of one cylinder of No. 2 unit to compensate for the additional generator load while No. 1 is out of service.

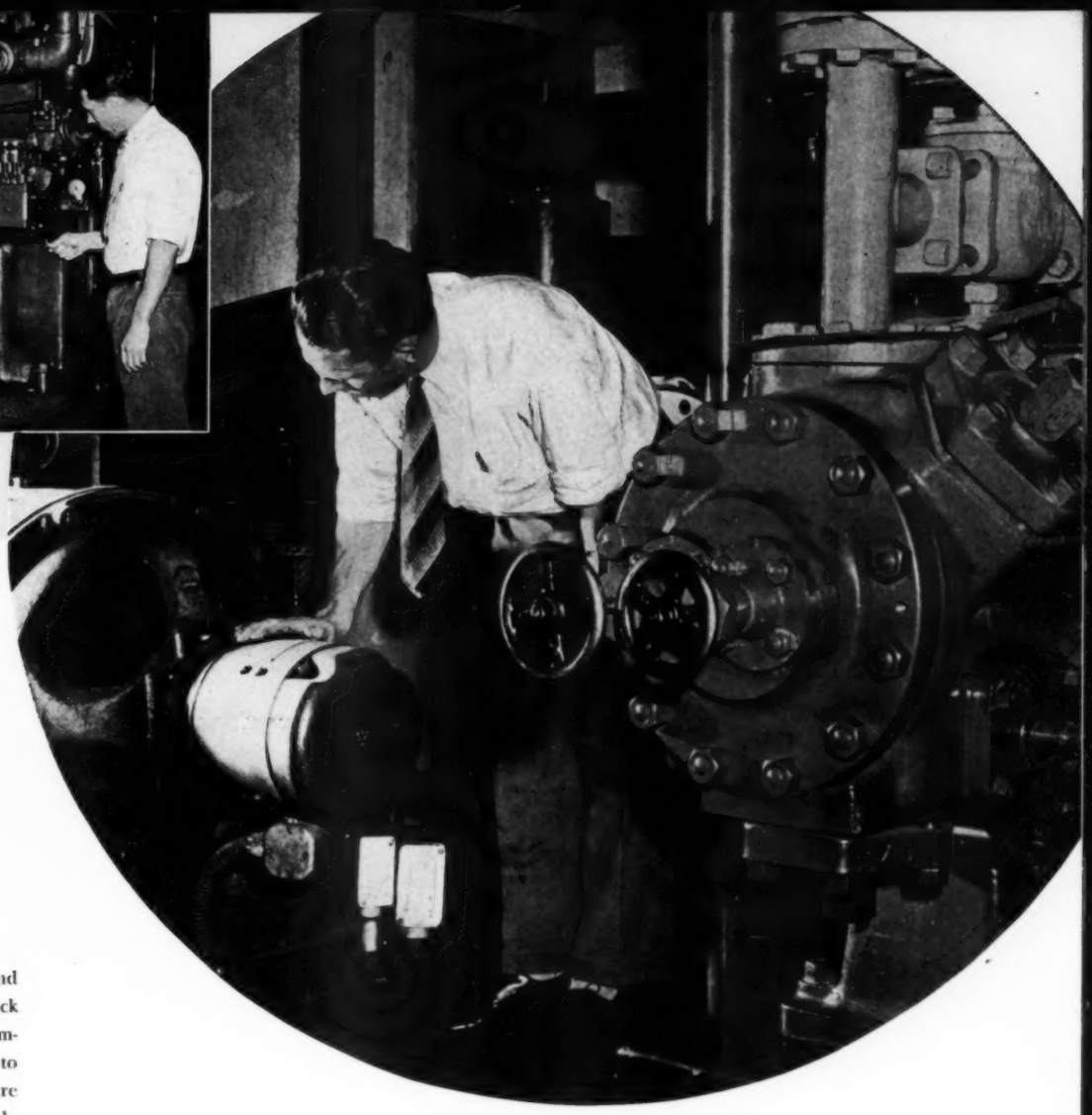
The new unit, No. 3, is so counterbalanced that all vibration is eliminated. Its three compressor cylinders are double acting, 12" stroke Worthington-Carbondale, one 7¾" and two 8¾" bore, equipped, as are the others, with the light weight, high efficiency, large area Worthington feather valves, a patented feature exclusive with the manufacturer. This unit has a refrigeration capacity of 185 tons of the total plant peak of 335 daily tons.

The total plant refrigeration demand at the present time is 225 tons. This leaves a margin of 110 tons for plant product expansion. All compressor cylinders of the three units are so connected that the plant's necessary three different ammonia suction pressures, 40, 25 and 10-15 lbs., are obtained simultaneously. The pressures in the order named are for cooling milk to 32 degrees; brine for storage cold room; truck pre-cooling and flake ice.

The brine tank, of 35,000 gal. capacity and



Compressor end of one unit, showing the Worthington - Carbondale horizontal compressor cylinders and Manzel lubricator.



Engineer Carson inspecting the Westinghouse generator. Note Vortox intake air cleaner, over his shoulder.

50′ x 16′ x 6′, is divided into two sections and lined with 6,900 lineal feet of 1¼″ coils. Truck refrigeration is supplied by the 9″ x 12″ compressor cylinder of the No. 2 unit piped to outside stations where direct connections are made to the two holdover plates in each truck. These shallow tanks have an ammonia evaporator welded to one side and are filled with eutectic, a brine jelly that freezes at 18 degrees. Each plate has an absorption capacity of 13,000 Btu. Truck temperatures are maintained at 35-40 degrees.

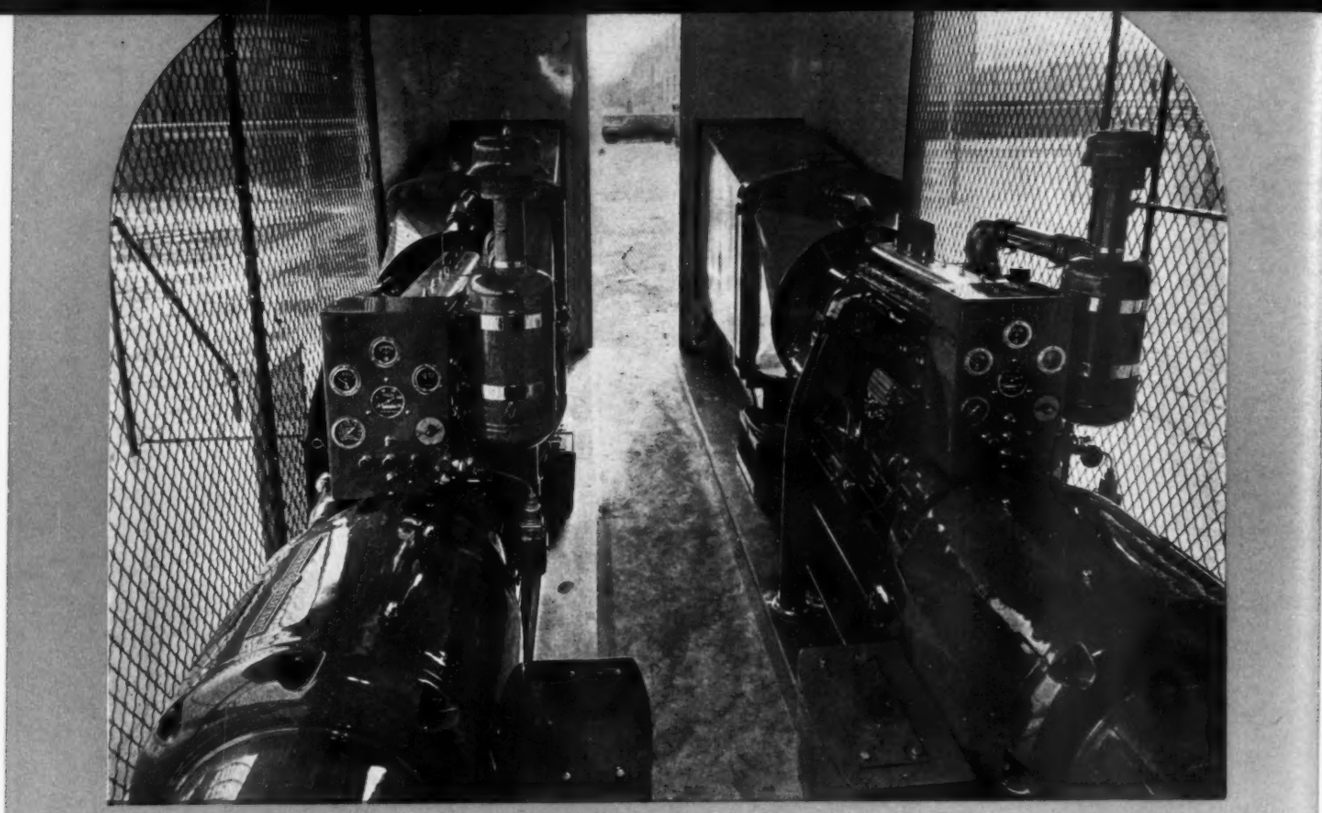
Flake ice is supplied by 10-ton York Flakice machine, the first of its kind on the West Coast. Calcium-chloride, ammonia cooled through a shell-and-tube brine cooler of the same make, is used. Storage capacity is 20 tons of what looks like giant soap chips.

All three engines start with compressed air. Unit No. 1 is controlled by constant speed governor; Nos. 2 and 3 by regulators set for minimum load to avoid too great a drop in suction pressures. Engines automatically stop if jacket water overheats, oil pressure drops too low, or ammonia pressure rises too high. Shell-and-tube heat exchangers utilize the exhaust heat for making service hot water.

Cooling is of the closed type with heat exchangers and ammonia evaporative condensor. The condensor is rated 225 tons capacity at 70 degrees wet bulb air temperature, 175 lbs. discharge pressure. Air is supplied by two 7 hp. fans delivering 60,000 cfm. Water evaporation is about 5,000 gals. with a flow of 275 gpm. A superheat remover and oil trap lowers the water temperature to 120 degrees entering the condensor, eliminating the tendency of solids to deposit as at higher temperatures.

According to Chief Mechanical Engineer N. S. McNeill, previous to installation of natural gas units, purchased power was costing approximately $40.00 a day for plant operation of 67 tons. This was at the rate of one cent per kwh. Present cost is estimated at 6 mills per kwh. on 225 daily tons, with gas consumption of 100,000 cu. ft. per 24 hours and one gal. lube oil per 2,400 hp. hours.

Engine and plant equipment, in addition to the three angle type compressors by Worthington: governors by Pickering; 60 kw. generator by Westinghouse; DTE lube oil by General Petroleum; Detroit lube oil pressure control; intake air filter is a Vortox; exhaust silenced by Maxim; water valves by Carbondale; U. S. motors, Buffalo fans and Vetter brine and superheat remover; holdover plates by Savage Arms Co.; recording thermometer by Motoco; Alco valves on truck lines, Mercoid switches; lubricators by Manzel; Bendix impulse couplers; gauges by Foxboro, Carbondale and Ashcroft; switchboard and instruments by Westinghouse.



Compact, parallel arrangement of the Diesel generating units provides liberal operating space within the trailer.

DIESELS LIGHT PLYMOUTH MOTOR FAIR

TO help carry the story of its products to the far corners of the country, Chrysler Corporation has taken some of the feature exhibits from the Chrysler Five-Star Show at the New York World's Fair on a tour that includes the principal cities of the United States. Known as the Plymouth Motor Fair, the caravan consists of eight huge streamlined trailers, each housing a part of the equipment that goes to make up an ultra-modern motorized tent show. So colorful are the big trailers which transport the Motor Fair that wherever it is seen people respond to it as to a real circus parade. The trailers are painted in rich red, white, and blue colors with the attractions spotted in blue letters on big attention-getting white stars.

The big main tent, called the Magic Theatre, is of unique design. No center poles block the view of the audience. One thousand persons at a time can be seated comfortably under the fire-proof canvas in modern steel chairs. Brilliant lighting, the best and latest sound equipment and a variety of up-to-the-minute movie "shorts" serve to pack in the audiences. Through special polarized lenses which are provided all visitors, spectators have an opportunity to view the amazing picture "New Dimensions", a three dimensional picture in technicolor. The audience is taken on a motion picture trip through the research laboratories of Chrysler Corporation, with Lowell Thomas as narrator and guide, and several other interesting movies are shown. Another special feature is the "Talking Plymouth" that baffled crowds at the World's Fair. Moving back or forth at spoken command, opening its doors and hood and blinking flirtatious headlights at pretty girls, this amazing car is a show in itself. There is also an actual working model of the Plymouth factory, the world's biggest auto assembly plant under one roof, with tiny workmen apparently producing midget cars 2½" long in a demonstration of modern mass production technique. Another large tent shelters a display of Plymouth products that includes the latest in passenger cars, commercial cars, and station wagons.

Aside from the entertainment value of the Fair, of outstanding interest is the Diesel-electric generator application worked out by Chrysler Corporation engineers to furnish the power for illumination, movie projection and operation of the mechanized displays. With this equipment the Fair can operate in any locality regardless of the type of power available–guaranteeing that the Show will always go on.

Housed in a separate tractor-trailer unit, the power system is made up of two Chrysler Industrial Diesel engines, each driving a synchronous type generator. The arrangement of engines and generators results in a compact assembly, neat in appearance, with weight and overall dimensions reduced to the minimum. The dry weight of each set is 2718 lbs., the overall length 7′ 2″; width 3′ and height 57½″. A Chrysler rubber coupling attached between the engine flywheel and generator shaft drives the generator with a minimum of torsional vibration and both sets are insulated from the trailer platform by the use of eight Chrysler rubber disc type engine supports.

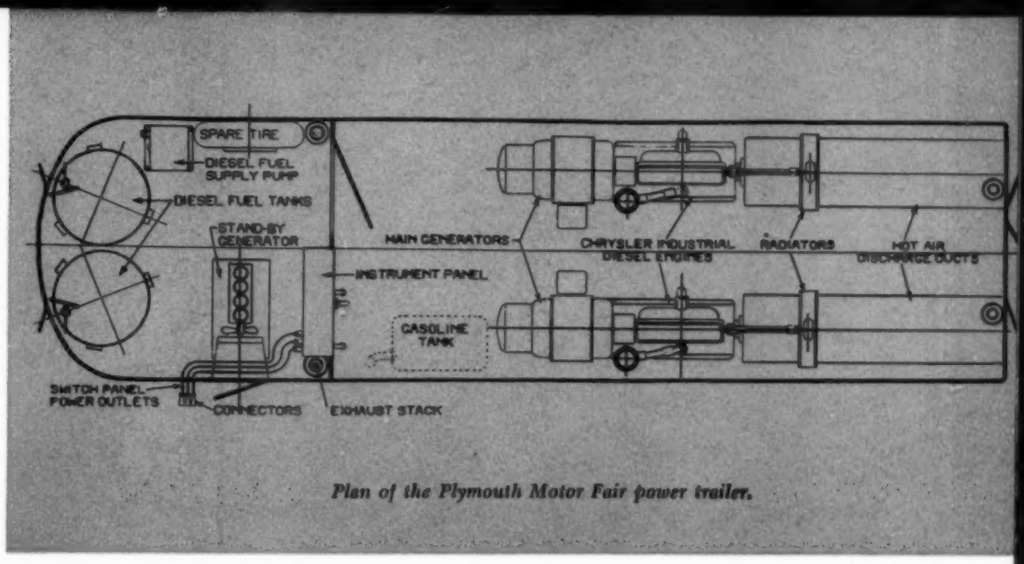
The power unit trailer is pulled by a 1½ ton Dodge cab-over-engine tractor. The trailer itself is 28′ long, 8′ wide and 11′ 8″ high. Overall length including tractor is 35′. Both sides of the trailer body may be lowered to provide catwalks 3½′ wide and 14′ long so that a large number of people may view the exhibit at one time. Steps lead from the catwalk to the ground and a handrail runs the entire length

of the promenade. The interior of the trailer is lighted by eight 40-watt fluorescent lamps located along either side of the ceiling and three search-lights are mounted on top of the trailer for drawing attention to the Fair.

Ample protection is provided for spectators by metal screens which are placed the full length of the open sides. As a further means of protection the fans have been reversed to act as pusher units to force the ventilating air and fumes through ducts and out the back of the trailer. To conduct the exhaust gases away from the spectators the exhaust pipes have been carried up and terminate on top of the trailer and a double muffler system is employed to make the unit quiet in operation. All distribution cables to the various display units leave by way of a trapdoor in the bottom of the trailer and are carried underground out of harm's way to their distribution point.

The power supply trailer has been divided into two sections using a partition on which is mounted the master control panel. In the forepart of the trailer ahead of the panel, facilities have been provided for a service compartment, two fuel supply tanks of 115 gallon capacity each, and a stand-by power plant with its switch panel and control panel. This power plant, too, has had the fan reversed for the purpose of exhausting the warm air from the service compartment.

In order to develop 30 kw. at the generator, the engine needs only develop 46 hp. at 1800 rpm. The engine is governed to give full industrial load at 1800 rpm. and the regulation is extremely close (1½% less). For example if the load should be suddenly thrown off, engine speed increases only 25 rpm. When load is suddenly applied the reverse is true.



Plan of the Plymouth Motor Fair power trailer.

Using two generators as a combined source of power, the second generator is synchronized with the first. This is done as follows: Speed and voltage of the generator to be cut in is brought to the same value as the generator already in operation. When synchronization is approached, two signal lights connected across corresponding phases of the two generators alternately change from "bright" to "out".

When the telltale lights are "out," synchronization is reached, the circuit breaker is closed, and the second generator is locked electrically to the first. Load may then be applied up to the combined capacity of the generators.

When operating at full load, each generator set will use about 3.5 gallons of fuel oil per hour. Based on actual purchased power costs in half a dozen trial cities, and assuming an eight-hour operating period, 300 days per year, the saving will be more than $7,000.00 per year for the power to operate the Plymouth Fair.

Chrysler Corporation engineers point to the value of the Plymouth Motor Fair as an effective display of the industrial Diesel engine in electrical generating service and its possibilities for use in other applications. Its flexibility, easy starting characteristics, and light weight are advantageous not only for mobile air compressors, pumping units, and generator and heating units, but in multi-engine installations where a number of engines may be hooked up to a single generator or pump combining the ultimate in portability, light weight, ease of operation and service.

The complete Diesel generating plant is housed in this portable unit.

Exterior of the compressor plant which houses twelve Clark gas engine angle compressors. At the right are seen the three high pressure absorbers.

COTTON VALLEY, LOUISIANA

WORLD'S LARGEST RECYCLING PLANT

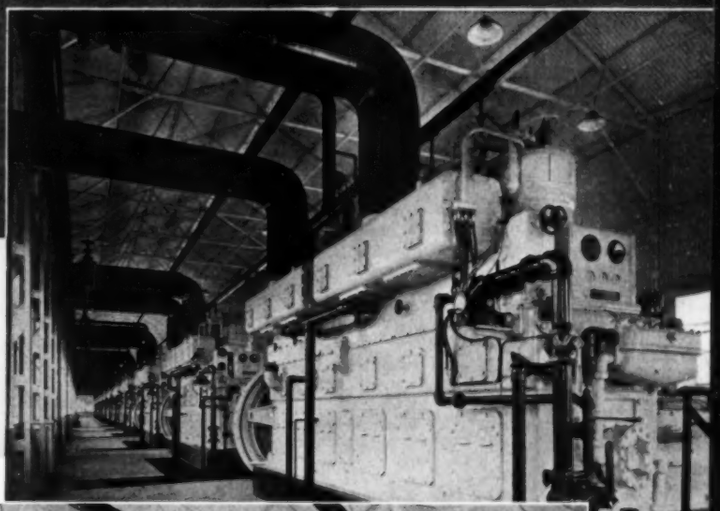
ANOTHER long step forward in the conservation of both liquid and gaseous hydrocarbons was taken in the utilization of the Cotton Valley field, Webster Parish, Louisiana, and the completion of the world's largest recycling plant. By unitization of the field is meant the politico-economic processes of bringing all concerned together under an agreement which fixes responsibility, authority, and equitable distribution of benefits. The history of the unitization of the Cotton Valley field, involving some 12,000 acres, numerous operators and royalty owners, is a long chapter in itself quite outside the scope of this article. Suffice it to say that the task accomplished is a tribute to long range planning and it opens the way to further conserve vital oil and gas supplies.

As to the benefits to be derived from recycling gas in reservoirs, the conclusions reached by the Louisiana Department of Minerals, based on expert testimony given in hearings, as well as results of plants already in operation, serve best to clarify and may be summarized as follows: 1. Maintenance of pressure in the reservoirs reduces the condensation of hydrocarbons in the sand which occurs when pressure is reduced. Should this condensation occur in the sand, instead of above ground, much of the oil would become trapped in the sand so that ordinary methods could never recover it. 2. By maintaining pressure underground, gas is conserved during production, especially where there is not an immediate market for all of the gas produced. 3. Where optimum porosity and permeability of the sands exist, wider spacing of the wells may be employed, thereby conserving the cost of drilling extra wells. 4. Recycling assures a larger recovery of hydrocarbons per acre with attendant benefits to operators, land and royalty owners and the general public.

In the light of world conditions, the importance of such a program of conservation need not be emphasized. It is essential, however, to visualize the material results to be expected from this project. Briefly, the total amount of condensable liquid originally in place in these reservoirs was estimated at 47 million barrels. During the period prior to starting pressure maintenance, some 77 billion cu. ft. of gas had been produced with resultant pressure decline and condensation estimated at 14 million barrels was lost. A total recovery of condensate under the recycling and pressure maintenance plan amounting to 22½ million barrels is predicted and this amounts to about 40% increase over the amount of liquid recoverable without pressure maintenance.

It will be seen that the basic operation in recycling is that of pressure maintenance which means returning the denuded gas to the underground reservoirs under pressure—real pressure; that is, upward of 3,000 lbs. per sq. in. This plant will handle 150 million cubic feet of gas per day, taking the gas from sixty-nine condensate wells and returning it to the sand reservoirs through ten injection wells at 3,200 lbs. per sq. in. pressure. The denuding process will produce daily 13,300 bbls. of natural gasolines, 2,500 bbls. of butanes, 2,400 bbls. of kerosene, and 650 bbls. of isopentane.

To accomplish the pressure maintenance phase of the recycling operations at Cotton Valley, twelve Super 2 cycle, 6 cylinder, right angle Clark gas engine compressor units of 600 hp. each, a total of 7200 hp., are installed. Ten of these units compress the gas and return it to the sand. These units are equipped with forged steel compressor cylinders and are arranged to give the plant the maximum of



Aerial view of the Cotton Valley recycling plant with the compressor building dominating the foreground. Twenty-four Burgess Snubbers for the twelve gas engine exhausts are seen.

Looking down the line of gas engines from the exhaust side. Note American Bosch ignition.

View of the compressor units. Note McCord lubricators and Alnor pyrometers.

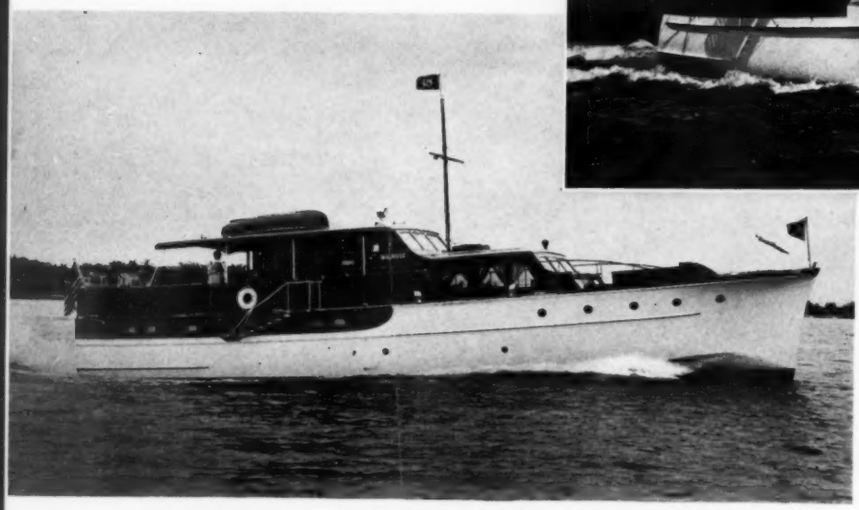
overall flexibility under a wide range of conditions. The other two compressors operate on recompressor vapors at 350 to 1500 lbs. pressure and are equipped with cast steel compressor cylinders.

The compressor units are protected by Vortox air cleaners, McCord lubricators, Fisher governors and Alnor pyrometers. Burgess Snubbers are installed on each engine exhaust, and the ignition systems are American Bosch. The generating plant consists of four Ingersoll-Rand "PVG" engines, rated 350 hp. at 370 rpm. and 400 hp. at 410 rpm., driving four 375 kva. EM alternators and four Louis-Allis D.C. generators. The engines are fitted with Pickering governors, and American Cycoil air cleaners.

UP TO THE MINUTE FAST DIESEL CRUISERS

One of the well known line of Elco 57 foot yachts built by Elco Yacht Division of Electric Boat Company. This ultra-modern yacht does 17 knots with a pair of 6 cylinder, 165 hp. Gray Marine Diesels turning twin screws through 1½:1 reduction gears. Her two double staterooms and deckhouse sleep six in unusually comfortable quarters.

"High Tide" is a 71' x 16' x 4' cruiser built by Henry C. Grebe & Co., Chicago, for Mr. H. J. Grant of Milwaukee. Her equipment features air conditioning throughout, indirect fluorescent lighting, shatterproof glass, a six unit public address system, ship-to-shore telephone, and twin 165 hp. Gray Marine Diesels with 2:1 reduction gears.

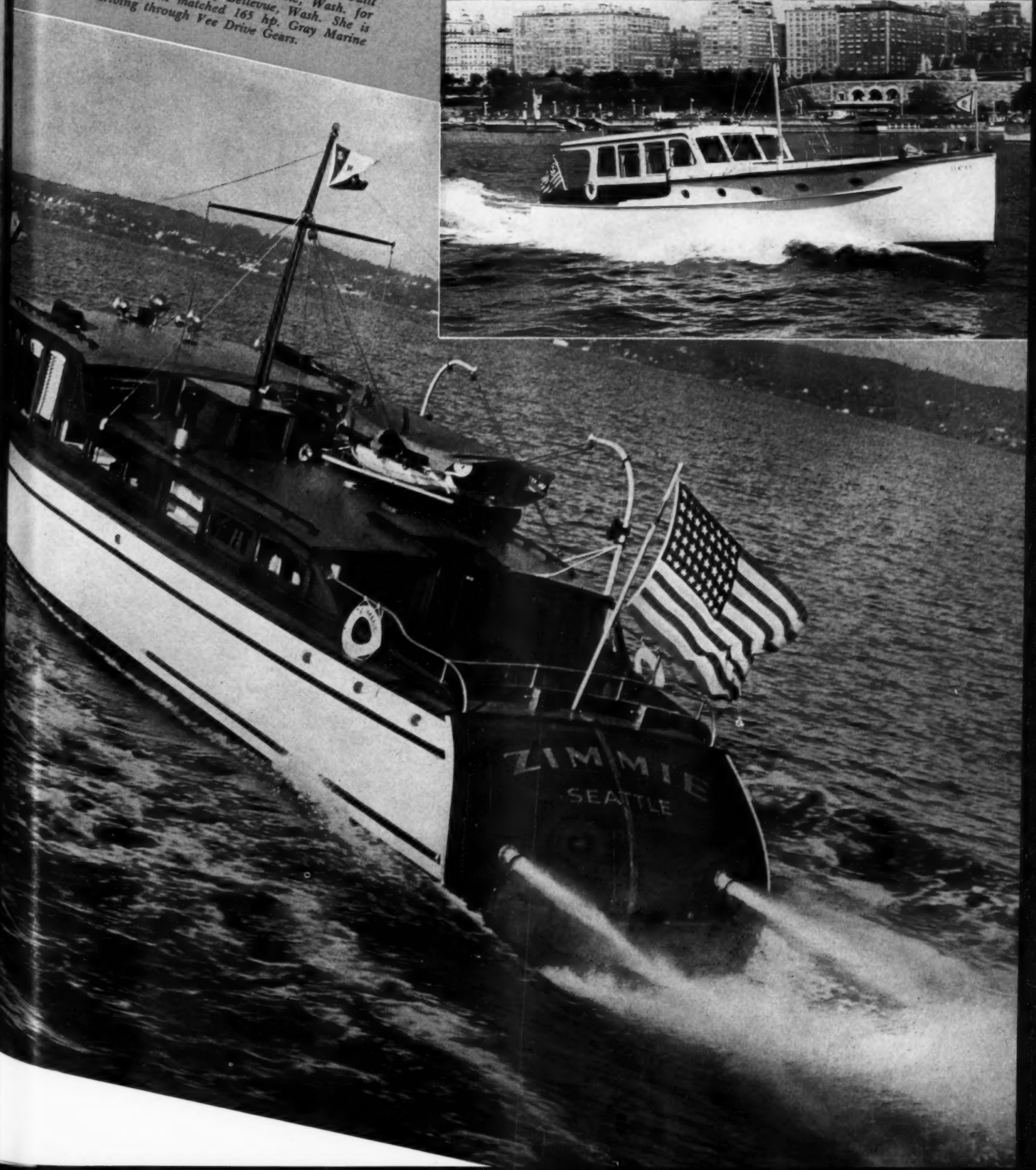


The "Wilrose" is an Annapolis "66", designed and built by Annapolis Yacht Yard for Colonel W. G. Stuber of Rochester, N. Y. Powered with a pair of 6 cylinder, 165 hp. Gray Marine Diesels with 3:1 reduction gears, she has a maximum speed of 14 knots and a sustained cruising speed of 12 knots.

SEEN on these pages is a group of recently completed Diesel yachts typifying many advances in design and appointment and better still emphasizing an ever increasing acceptance of Diesel engine propulsion for fast, economical and safe cruising. For example, one of the yachts, the *Wilrose,* on a 1200 mile run southward last December, recorded fuel consumption of less than ¾ gallon per mile. She is a 66 footer, with a 15' 3" beam, 4' 9" draft and a displacement over 80,000 lbs. Larger, more comfortable quarters characterize modern yacht design and to this feature the development of more compact, lighter weight power units has contributed much. The safety of non-explosive fuel is also a vital factor in the increasing acceptance of Diesels among yacht designers and discriminating buyers. The yachts illustrated here are powered with twin matched Gray Marine Diesels which are based on the engine developed and built by General Motors, adapted for marine service by Gray. It is interesting to note that while all of these are pleasure craft, there has been a nearly even distribution of this type of engine between pleasure and work boats during the past year; 47.7% having gone into work boats and 52.3% having been installed in yachts.

A much-talked-about Pacific Coast yacht, the "Zimmie" is a 63', streamlined cruiser, designed and built by Shain's Trimmerships Yard, Seattle, Wash. for Mr. Stanly W. Donogh, of Bellevue, Wash. She is powered with twin matched 165 hp. Gray Marine Diesels driving through Vee Drive Gears.

The "Josephine M III" is a Mathews "50" sport sedan cruiser, built for Mr. Harry Liebeck of Swarthmore, Pennsylvania. Her twin, 6-cylinder, 165 hp. Gray Marine Diesels with 1.5:1 reduction gears push her along at 23 mph. top speed.



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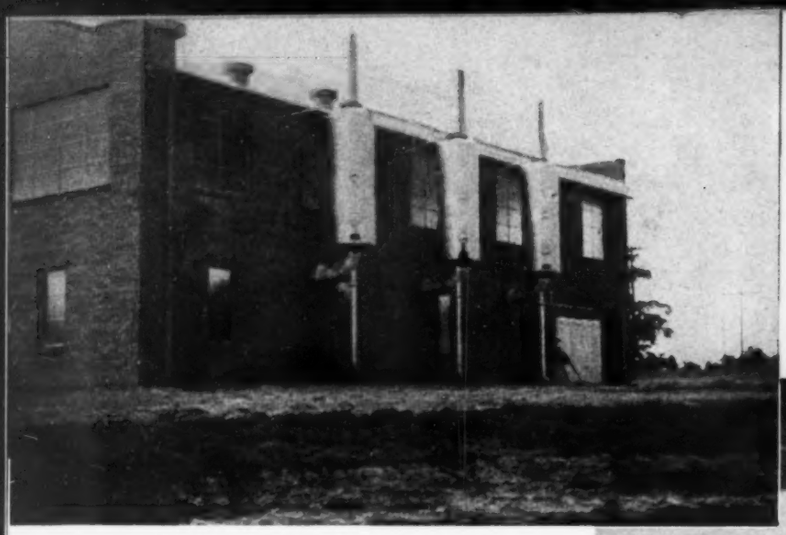
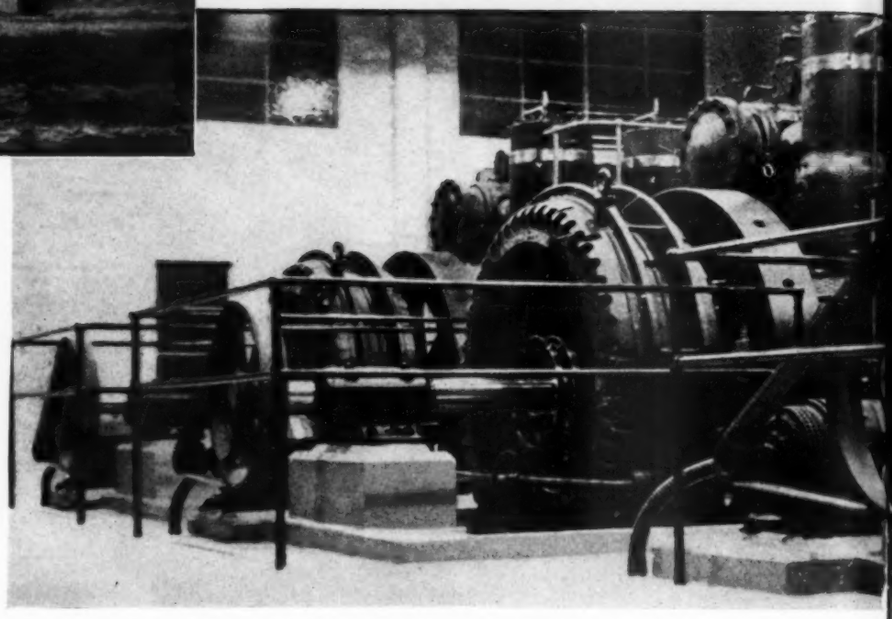


Exterior view of the Jasper, Texas, plant showing Burgess exhaust Snubbers.



View showing the three Fairbanks-Morse Diesels and generators.

THE vast forest of Deep East Texas, known as the Piney Woods, has long been renowned as a place of beauty and as the greatest reserve supply of concentrated natural resources in Texas. Its settlers, from the days when the Spanish roamed under the lofty canopy of giant pines, have been marked by their independent spirit, and their pride in making their own way and making it pay.

In a sensible business-like manner they range their livestock, clear the deep sandy loam for cotton, grains, sugarcane, and truck gardening, touch the vast supply of timber conservatively, and keep a knowing eye on the barely tapped pool of oil believed to underlie much of the surrounding region.

The City of Jasper, county seat of Jasper County which was once included in the Spanish Empresario land grant of 1829, has one hundred and six years to its credit in which it has been regarded as one of the most progressive and normally prosperous small towns in East Texas. The spirit which named the community in honor of a hero of the Revolutionary War is still in evidence, and Jasper has taken an important step in furthering its advancement by installing a municipally owned light plant, the newest operating in Texas.

After a month of performance, the plant promises to become one of the most important industries of Jasper, and to further also the various branches of the timber industry which has been paramount since 1880.

The practicability and economy of municipal ownership is not new to the citizens of Jasper who own and operate the water and sewer utilities and derive from them an average annual net profit of about $5,000. Aside from the prime factor of the earning power of the Diesel plant, they could foresee other benefits such as better lighting of the streets, improvement in the appearance of the town by the construction of the modern brick building housing the Diesel generating units, and elimination of the annual payments made to the private utility owners.

Accordingly, in 1937, the citizens and city council began considering the construction of a municipally owned light and power system.

There was no particular complaint against the service of the existing private utility, although it was conceded that the rates were higher in Jasper than in comparable cities, but as Mayor Marvin P. Hancock stated in 1938: "An electric light and power system renders a social commodity that ought to be maintained by and for the use of the citizens as in the case of the water and sewer utilities."

Preliminary engineering studies were made as to the feasibility of the proposed municipal light and power plant by H. B. Gieb & Co., consulting engineers of Dallas, Texas, who concluded in their report that the proposed project was entirely feasible and advisable and self-liquidating in character.

The plant was financed entirely by private capital. Revenue bonds were issued which are payable solely out of the profits of the plant, after first deducting all expenses of operation and maintenance. The profits the city will obtain from the electric plant will enable Jasper to reduce or eliminate taxes after the plant is paid for. Such has been the case in practically every other municipally owned and operated light and power plant.

The plant consists of three units: two 300 hp. and one 225 hp. Diesel engines. They were ideally selected to give the city the most economically running load factor and, at the same time, to maintain standby service in case of nec-

JA ER, TEXAS

A. V. REITER

A train load of timber from the vast pine forests of Jasper County.

essary repair on one unit. On peak loads one 300 hp. unit and one 225 hp. unit are operated in parallel, and on intermediate loads one 300 hp. unit operates, and on the off peak load the 225 hp. unit carries the load. This allows a reserve of one 300 hp. unit at all times.

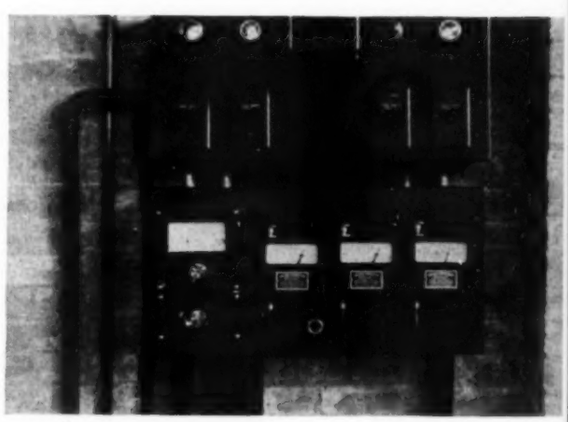
The engines are all 14 inch bore 17 inch stroke operating at 300 rpm. and have interchangeable parts. The lubricating oil is reclaimed at necessary intervals, by the contact filtration method. The cooling system is simplified and made very compact by using raw and soft water built-together pumps and evaporative coolers installed within the engine room. Each engine is direct connected to an alternator and with V-belt driven exciters and with the alternators on the end near the switchboard.

The exhaust is taken out overhead through exhaust silencers on the outside of the building.

The scavenging air is taken from the top of the engine bases through air filters. Starting air is stored in tanks outside the building as is the main and day storage fuel.

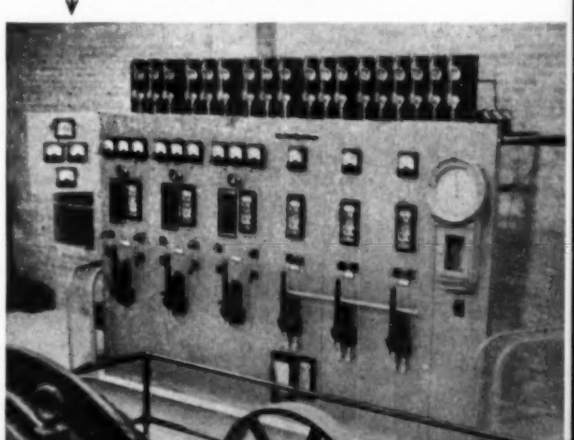
All water and oil pressures and temperatures are shown on an elaborate alarm and gauge board installed at the operating end of the engines. On this same board fuel oil quantities and exhaust temperatures can be quickly read.

The main equipment in the plant consists of two 4 cylinder 300 hp. and one 3 cylinder 225 hp. Fairbanks-Morse Model 32E14 Diesel engines each with a Fairbanks-Morse direct connected alternator and belted exciter. The built-together soft and raw water pumps and the two evaporative coolers are also built by Fairbanks, Morse & Co. Engine governors are Woodward IC. Exhaust and intake Snubbers are by Burgess, switchboard and instruments by General Electric, lubricating oil reclaimer by Youngstown Miller, fuel oil gauges by Liquidometer Corporation, air tanks by Diesel Plant Specialty Co., hoist by Chisholm Moore, water softener by Graver.



Instrument board with Alnor pyrometer left, and Levelometer tank gauges, right.

The General Electric switchboard.



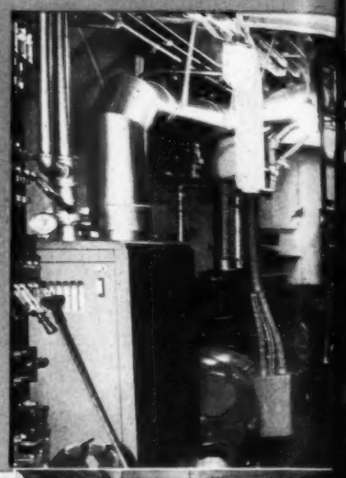
LARGES OMM
DIESE UG

THE usual high tempo of activity in the shipyards of Ira S. Bushey & Sons of Brooklyn, New York, was accentuated during the middle of June and this added vigor represented the completion of their latest contribution to the tugboat industry, the *Barryton*.

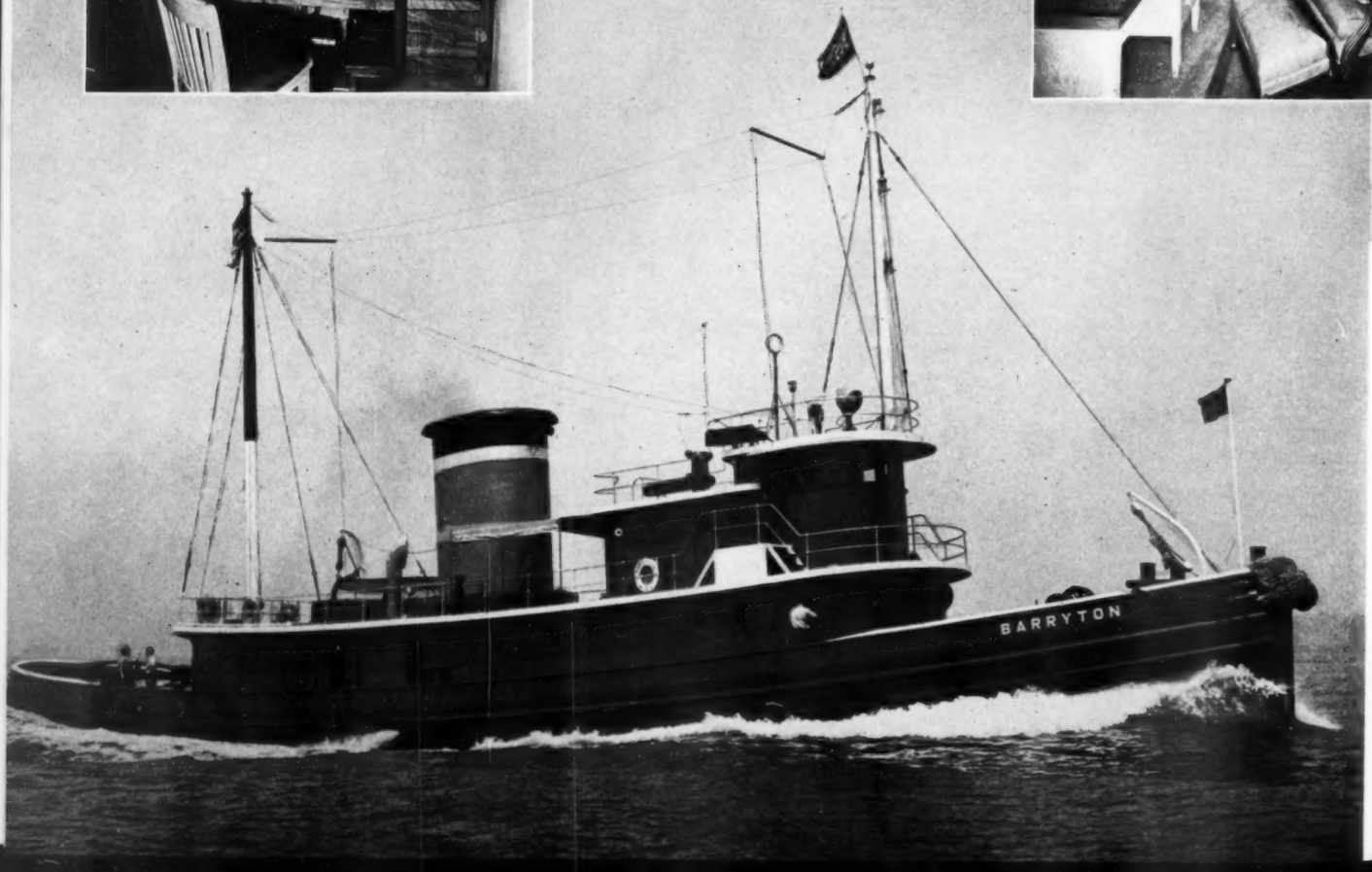
On June 14, the *Barryton* set sail for New Orleans. It was with a minimum of ballyhoo, but a maximum of interest on the part of Marine Fraternity. For the *Barryton* is the largest direct drive Commercial Diesel tug in the United States, and its entry into service has been watched closely. Beyond that important fact, it also marks a further step for the Busheys inasmuch as this is not a new tug, but one built in 1919, originally steam powered, and now completely reconstructed and converted with the many celebrated Bushey innovations and powered by a 1400 hp. Fairbanks-Morse Model 37 Marine Diesel engine. The *Barryton* has followed the Bushey pattern in its complete equipment, beauty of line, luxury of appointments. She is ready for a career of strenuous and profitable service. This magnificent 150 footer with 27.7 foot beam, a 14.8 foot depth and a 17 ft. draft has a 3-blade bronze wheel.

It is a real treat to step on any Bushey tug, and the *Barryton* magnifies this rule. As her captain remarked to the writer prior to sailing —"It's closer to a liner than a tug." The exterior grace of the vessel, however, and the completeness of her equipment have not detracted from the utility of the tug.

There is real power in the *Barryton* supplied by her 8-cylinder, 16" bore x 20" stroke, direct reversible marine Diesel main engine, rated at 1400 hp. at 300 rpm. The lower engine room that houses this power equipment is particularly spacious and affords genuine room for the Chief Engineer and crew. The main engine is fitted with oil-cooled pistons, open head combustion, differential injection valves, back flow scavenging, and twin Nugent fuel oil filter. The two Diesel Power units consist of twin 6-cylinder, 90 hp. 900 rpm., 5½" bore x 6" stroke, Fairbanks-Morse Model 36 Diesel engines with regular built-in equipment and two 60 kw. Electro Dynamic generators. Also noted in the engine room are two motor driven auxiliary air compressors consisting of 38.9 cubic foot per minute scavenge air compressors, direct connected to two 15 hp., 115 volt F-M direct current electric motors.

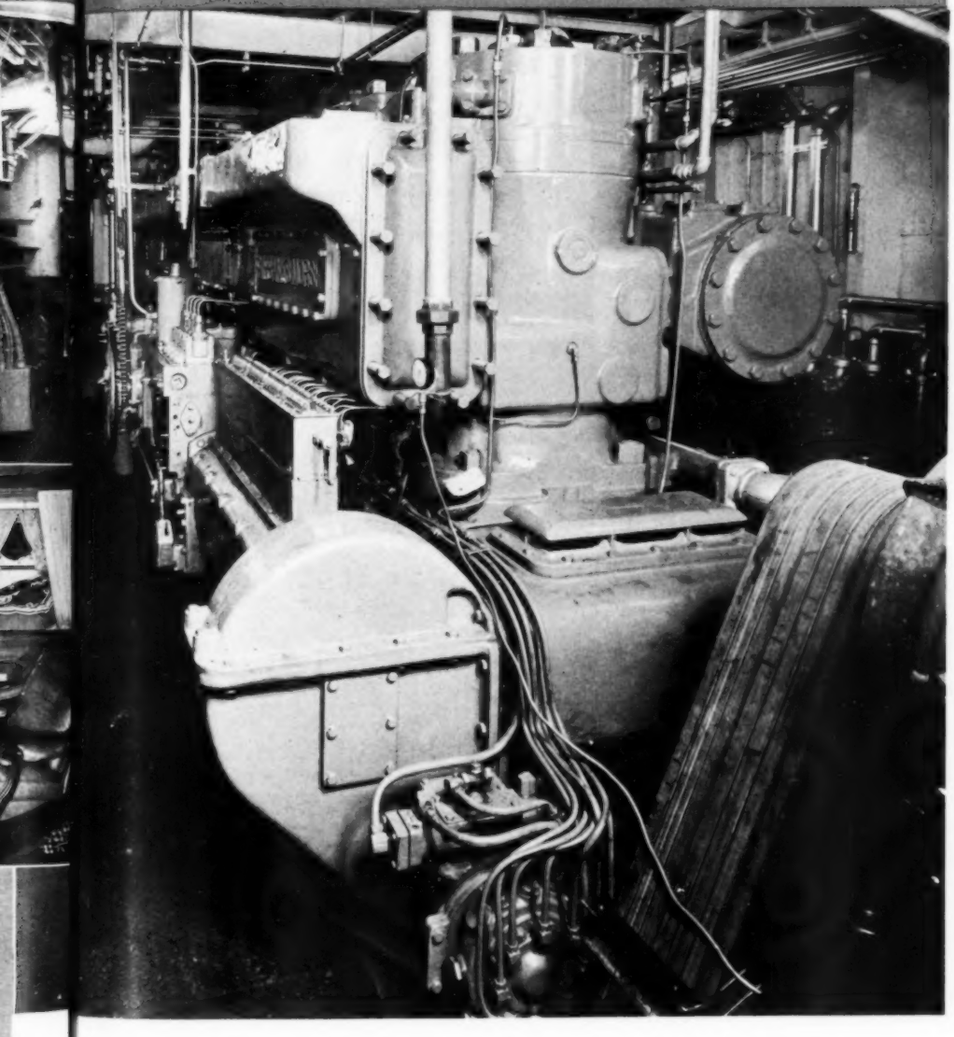


Left: Radio room. Right: Captain's quarters. Below: The 150-ft. "Barryton" on trial run.



OMMERCIAL DIRECT DRIVE UG IN AMERICA

By HENRY A. STEPHENS



The main engine, a F-M, 8 cylinder Diesel rated 1400 hp. at 300 rpm.

Schutte & Koerting furnished the heat exchanger, oil cooler and duplex lubricating oil strainer while Maxim supplied a spark arrester exhaust silencer for the main engine and one each for the power engines, as well as the air intake silencer. There are six 30 x 96 inch U. S. Local air tanks and fittings, a Brown pyrometer instrument with thermocouples and Youngstown Miller oil purifier equipment. The extensive pumping equipment includes a 5" Fig. 5811 F-M centrifugal pump, direct connected to a 10 hp. F-M motor for soft water and a similar unit for raw water. There are two ⅜" Type 7 F-M Fig. 5135 all bronze Perfection Rotary pumps, direct connected on a common sub-base to two ¼ hp., 115 volt D.C. Wagner motors, and a 2" Type 5, Fig. 5135 F-M bronze fitted Perfection rotary pump, direct connected on a common sub-base to a 1½ hp., 115 volt D.C. Fairbanks-Morse marine type motor. Also a 2" Fig. 5520P, F-M bronze fitted centrifugal pump, rated 125 gallons, direct connected to a 1½ hp., 115 volt D.C. F-M marine type motor.

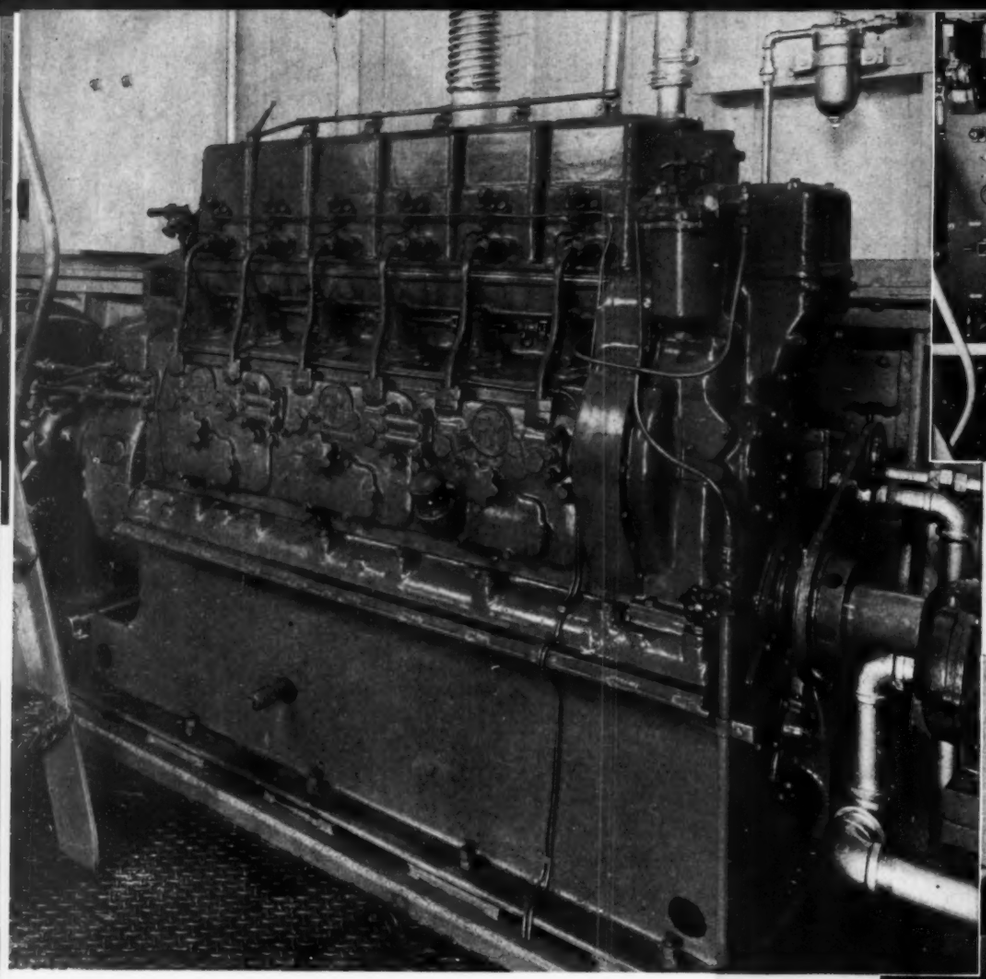
The spacious upper engine room contains the usual array of equipment that has proven most satisfactory in Bushey's experience. The engine room control is by Fairbanks-Morse and the important items on the instrument panel include air and oil pressure gauges by Consolidated Ashcraft Gauge Company, the Weston Tachometer, the Brown Pyrometer, the Seth-Thomas Time Clock.

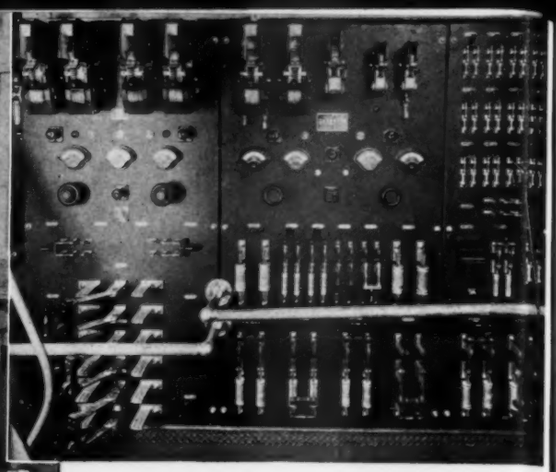
All electrical control panels found throughout the *Barryton* were built by Smith-Meeker Engineering Company, utilizing the suggestions advanced from the experience of Ira S. Bushey & Sons. There is plenty of room for relaxation in the upper engine room and luxury is supplied by the comfortable leather covered cushioned benches as well as the desk and chair and the flush mounted lighting fixtures with moisture proof wiring.

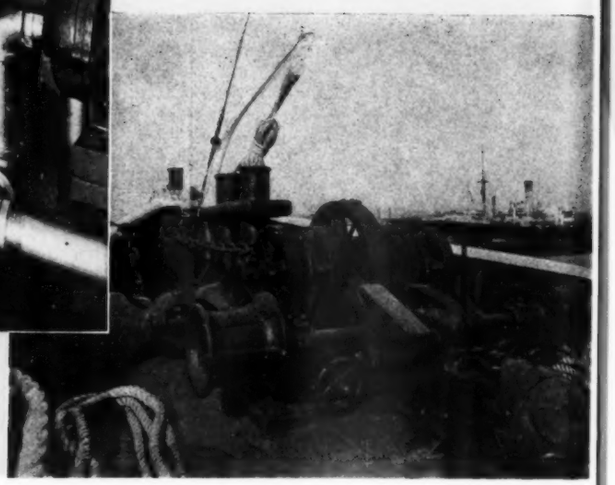
The *Barryton* adds another chapter to the record of Johns-Manville acoustical veneer installations, this veneer being backed with their super felt on walls and ceilings, utilized in sound-proofing aboard the *Barryton*.

One of the truly outstanding features of any Bushey tug installation is the crew quarters. On the *Barryton* even past records are eclipsed by the splendid accommodations offered the men. As we found on the *D. T. Sheridan*, a system of inner-passageways exists on the *Barryton* so that in stormy weather it is not necessary for the crew to go out on deck in order to get from one part of the tug to the other. The inner-passageway is an attractively finished corridor, off which we find the general crew quarters, as well as the First Mate's and Chief Engineer's rooms.

The general crew quarters comprise six rooms with accommodations for twelve men, each room comfortably furnished with two solid maple berths, with drawers beneath and two steel lockers with the necessary outside and inside hooks for clothing, etc. There is a modern wash basin with hot and cold running water, a large medicine cabinet with mirror over the wash basin, a Westinghouse electric fan, flush-mounted ceiling lights, Pullman berth lights, steam radiator and mushroom ventilators. For those that feel the urge to write home, there's a collapsible table which folds up against the wall and may be utilized as a desk. Dex-O-Tex flooring is found in each state room, furnished by Crossfield Products Company, as







Above: One of the twin 90 hp. F-M Diesel auxiliary generating sets. Top: The Smith-Meeker switchboard. Right: Towing bit and electric capstan.

well as metal fireproof doors furnished by the Jamestown Door Company. A bow for neat plumbing goes to Munkenbeck Brothers.

The First Mate and Chief Engineer's quarters are along lines similar to the crew's, with the exception of their having single berths and an actual table and chair.

It is said it is always a pleasure to enter a Bushey Galley, and whether this is viewed from the recipient of the Bushey cook's efficiency in the culinary art, or from the viewpoint of the completeness and quality of the material in the galley, it completely holds true.

Going directly aft and through the inner corridor, we come to a screen door which opens into the *Barryton's* spacious and soundproof galley. Here again, Johns-Manville acoustical veneer, backed by their superfelt on the ceiling, ends the normal noise found on tugs. The crew's "three squares" are prepared on the WebbperfectioN galley range No. 420, equipped with Val Jean padded carburetor burner manufactured by Elijah Webb & Son. The most important item in any galley, food, is kept in a large electrical refrigerator of stainless steel interior and attractive light walnut exterior and was furnished by Rex Refrigerator Co.

In climbing up to the pilot house we find that this is finished in two-tone walnut and fully equipped with an arrow direction finder by Bludworth, Inc., a clock by Seth-Thomas and pedestal, brass binnacle and spiral compass by Negus. There is also a switch panel for control of the running lights, side lights and operating lights, as well as the Weston Tachometer and a Western Electric ship-to-shore telephone. In the pilot house is again found the Dex-O-Tex floor covering and the sound-proof ceiling by Johns-Manville.

The captain's quarters rightfully hit a real high in comfort. Located directly aft of the pilot house and finished in a blending white and gray stain, sound-proofing and Dex-O-Tex floor covering are again evident. As a concession to the skipper's home life, however, there is a large pattern rug and an immense leather cushioned lounge chair with foot rest. The single berth has ample space beneath and offers not only a curtained bed, but also individual Pullman lights, a large shelf for books at the foot of the bed, a thermos bottle and glasses on the shelf attached to the wall, and concealed ceiling lights.

As an emergency safety feature, Phomene Fire Extinguishers are used throughout the vessel, manufactured by the Pyrene Manufacturing Company.

The *Barryton* has already seen active service, and like her predecessors sailing from the Bushey Yard, has responded nobly. Here is the largest commercial direct drive Diesel tug in the United States, reconstructed and converted in every particular, and thanks to the skill and ingenuity of Ira S. Bushey & Sons, a truly "new" addition to the towing fleet.

Three 1000 hp. Fulton Diesels and 700 kw. General Electric generators in Plattsburg's modern power plant.

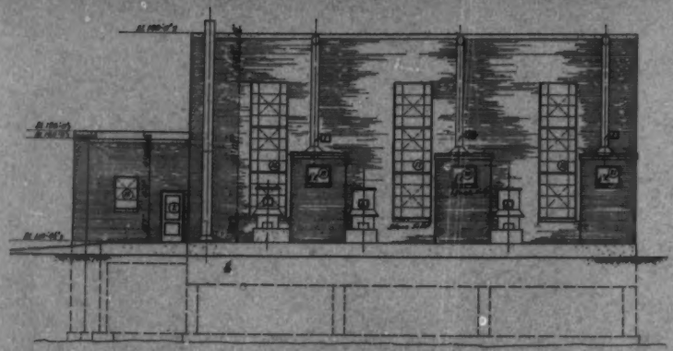
PLATTSBURG, NEW YORK

By GLENN C. BOYER*

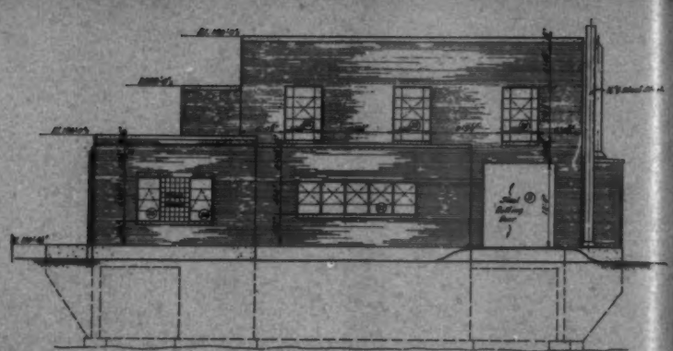
PLATTSBURG, New York, famous in history for the repulse of the British Fleet on Lake Champlain on September 11, 1814, by Commander Thomas Macdonough, broke into the limelight with its four-year battle to construct a municipal electric system. This modern battle may never go down in history, but the Diesel-electric generating station which the City built to supply power for its electric utility contains many innovations in plant design which class it with the most up-to-date municipal plants in the country.

Confronted with a problem of providing a plant of sufficient capacity to supply the load it would obtain under competitive conditions and with a limited amount of capital available for its construction, it became necessary to develop a compact, modern plant, suitable for operating under the climatic and load conditions at Plattsburg. The plant was originally intended to handle 60% of the available load in Plattsburg, but subsequent negotiations between the City and the private electric utility serving the city resulted in the sale of the

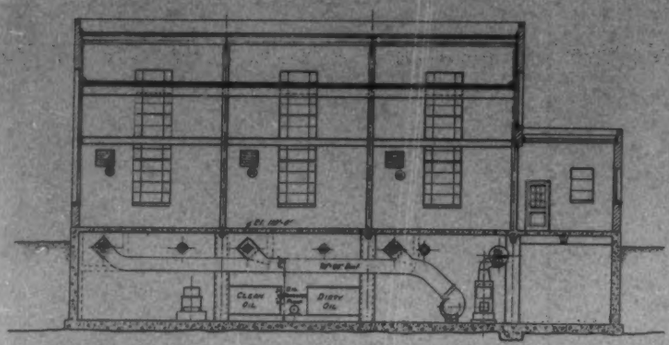
* *Associate Engineer of Burns & McDonnell Engineering Co., Kansas City and Cincinnati.*



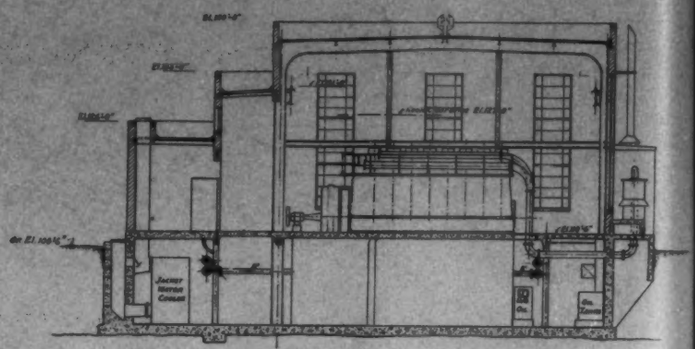
SOUTHEAST ELEVATION



SOUTHWEST ELEVATION



Section showing fan and heating ducts and oil conditioning equipment.



Section showing evaporative coolers, exhaust piping and oil tanks.

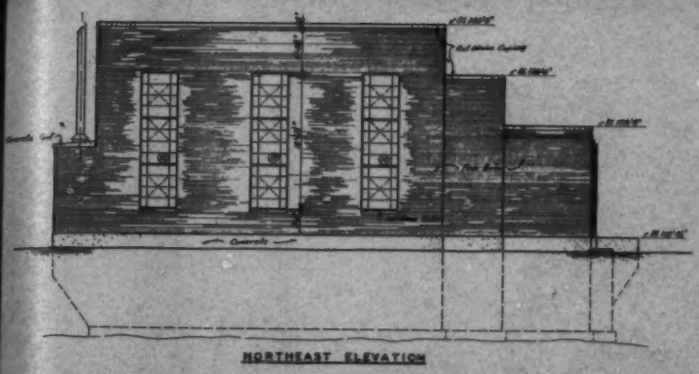
electric distribution system to the City. With all of the load to be supplied instead of the original 60% contemplated, modifications in the initial plan for the Diesel plant and its operation were necessary. Since the local utility was purchasing all of its energy from hydro-electric projects in the vicinity, the City negotiated with these same suppliers of electrical energy for the additional energy needed. A contract between the City and the suppliers of hydro-electric power provides for an interchange of power depending upon loads and available water supply.

The plant, located on the shores of Lake Champlain, contains three 1,000 hp. Fulton Diesel engines direct connected to 700 kw. 80% power factor generators. The engines are four-stroke cycle, 8 cylinder, 225 rpm., mechanical injection units having cylinder dimensions 17½" x 24½". The generators built by the General Electric Company are provided with all six high voltage leads brought out so that they may be operated at 2,400 volts delta, as they are now operating, or they may be changed over for operation at 4,160 volts Y at a later date.

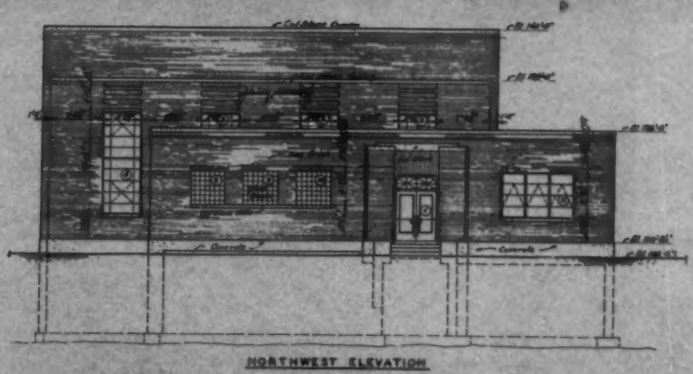
Realizing that the arrangement and coordination of the Diesel engine generating units and all of the auxiliaries necessary for their successful operation are of greatest importance in producing a successful power plant, the engineers gave much consideration to the arrangement of equipment. Each equipment item was placed where it would function to the best advantage within the limitations of the building space available. Starting with the engine room proper, the engines were located for maximum accessibility and arranged so that accessories pertaining to the engine were located at the engine end of the unit; electrical equipment being kept at the end adjoining the generators. The only violation of this rule was in the location of the jacket water coolers which, due to space limitations in the building, had to be placed in the basement underneath the switchboard room.

The plant site was a former dump. Coarse gravel and boulders overlaid by a 10-foot fill composed of a mixture of sand, ashes, and miscellaneous rubbish constituted the foundation material. Due to the fact that the variation of the lake level was such that the water was known to have risen practically to the top of the ground on which the plant was to be located, it became necessary to give special attention to the design of the foundation for the building and engines. After an extensive study of the entire foundation problem, it was decided to construct a reinforced concrete mat approximately two and one-half feet thick to support the building and all equipment. The basement walls were sealed to this mat by the use of copper sealing strips, and precautions were taken to insure a water-tight mat and basement walls. The engine foundation blocks were doweled into this mat.

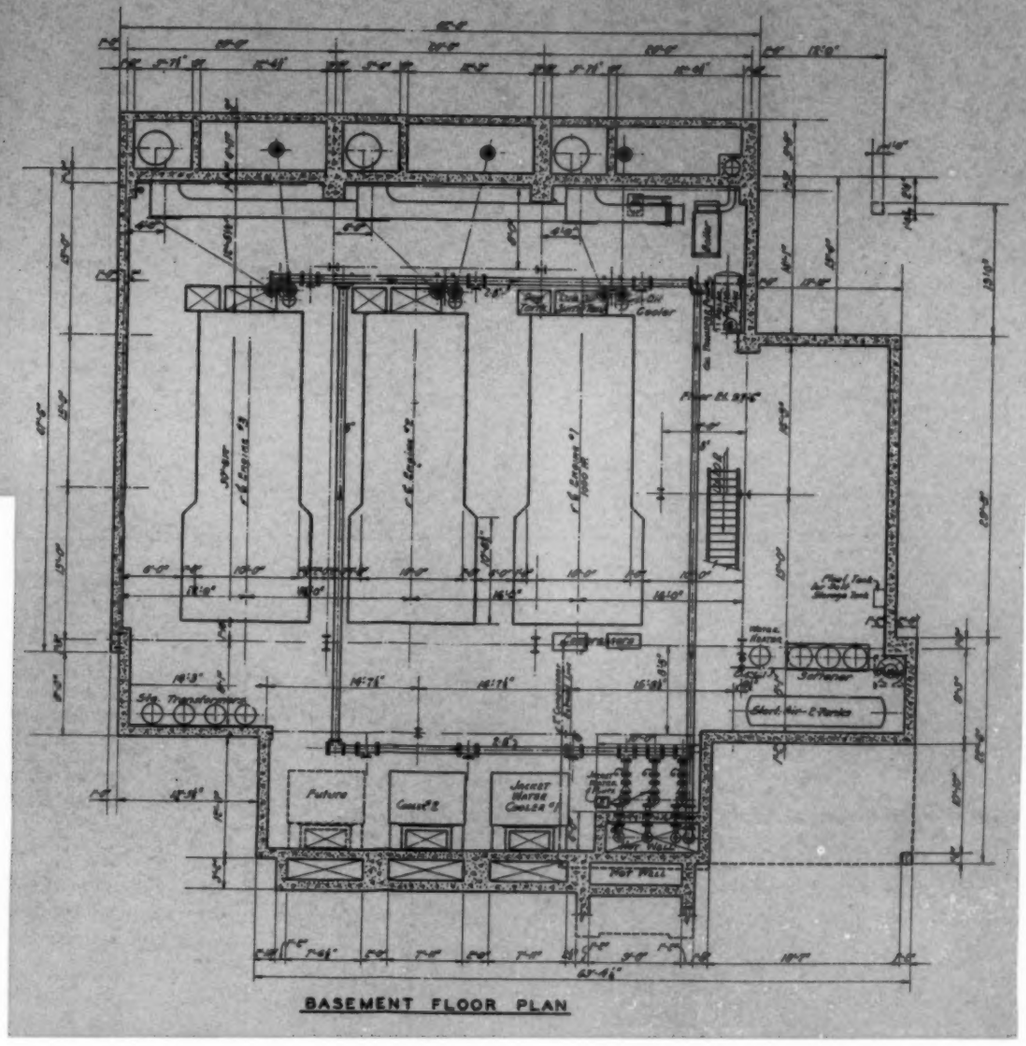
While the building proper was constructed with steel framing and brick, the use of rigid frame trusses in the engine room and the modern treatment of the building exterior provide a pleasing interior as well as exterior to the plant. Glass block was employed in place of the conventional steel sash windows in the switchboard room in order to eliminate the possibility of electrical difficulties due to possible leaking of water around the sash during a storm. Shop facilities were installed at one end of the building. Provisions were made for



NORTHEAST ELEVATION



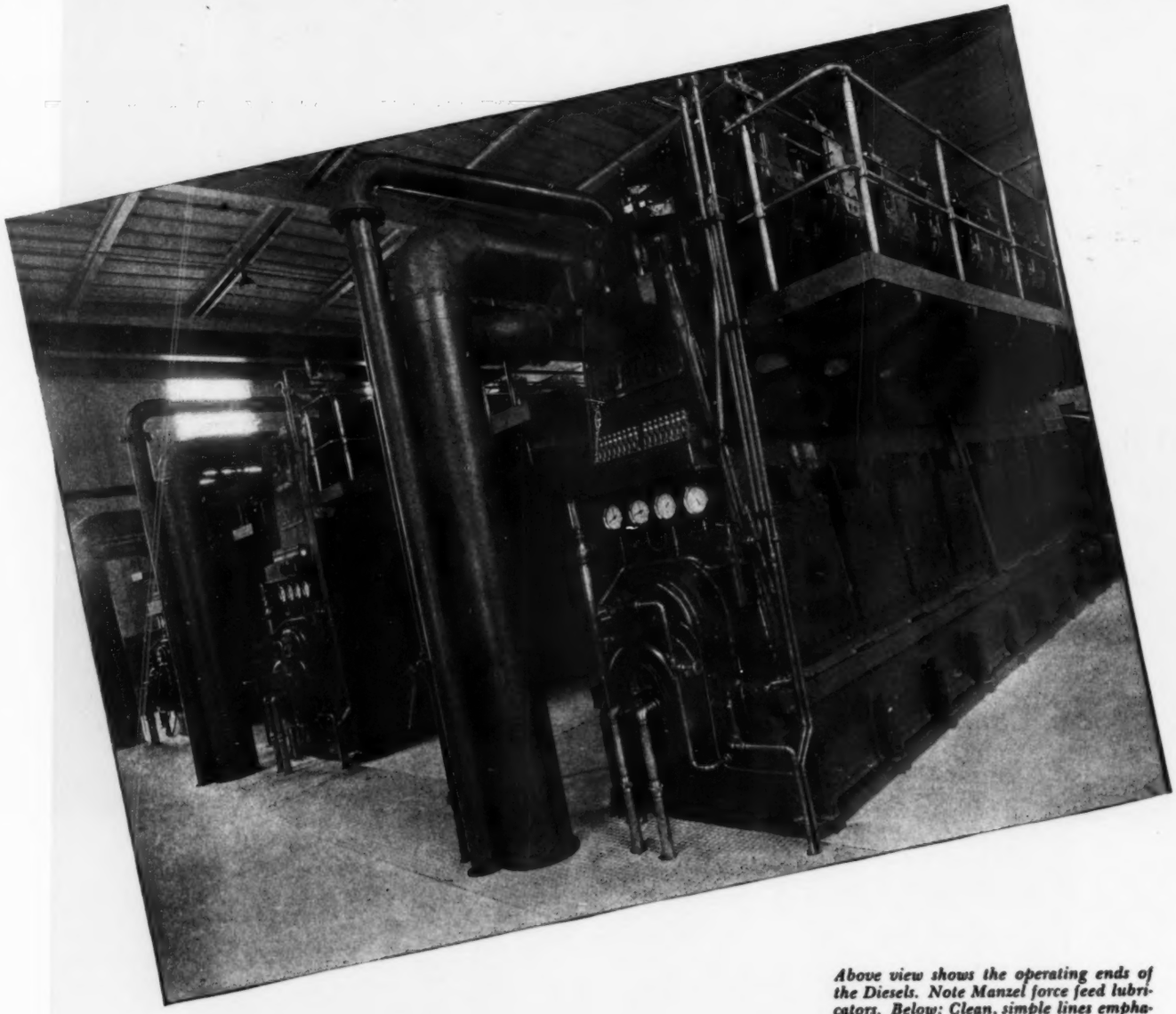
NORTHWEST ELEVATION



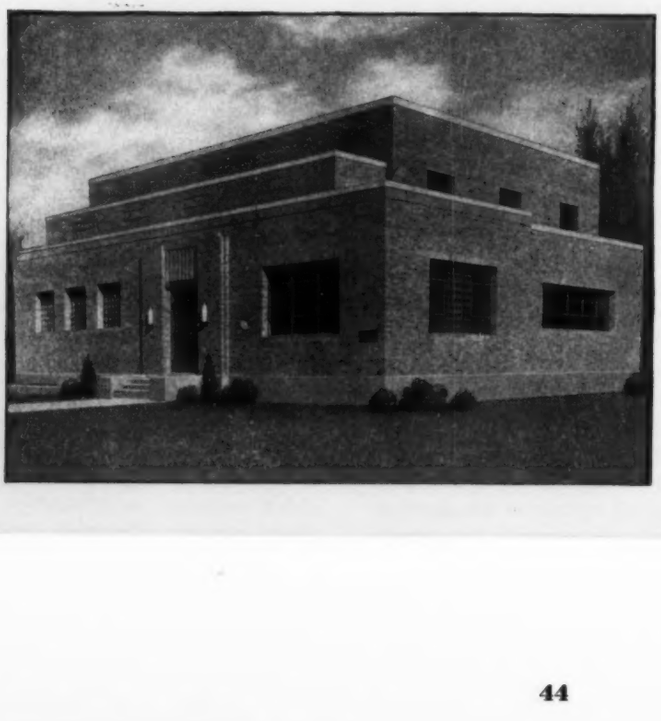
BASEMENT FLOOR PLAN

using the traveling crane to move parts from any one of the three engines to the entrance to the shop, or for lowering equipment into or removing equipment from the basement.

Several design features in this particular instance are somewhat unusual. While the plant is located directly on Lake Champlain, the cooling water for the engines is furnished by evaporative coolers. Climatic conditions, with extremely cold weather during the winter months, often result in the shallow portion of the lake adjoining the plant freezing solid. The use of the lake as a cooling water source would have required long and expensive intake lines laid out into the lake to a point where water could be obtained throughout the year. Likewise, the extremely low temperatures were not conducive to operating of cooling towers, particularly when there might be periods during the winter months when the plant might be shut down and all energy requirements furnished from the hydro-electric system. These limitations, therefore, required that the cooling system should be capable of either continuous or intermittent operation under extremely unfavorable weather condi-

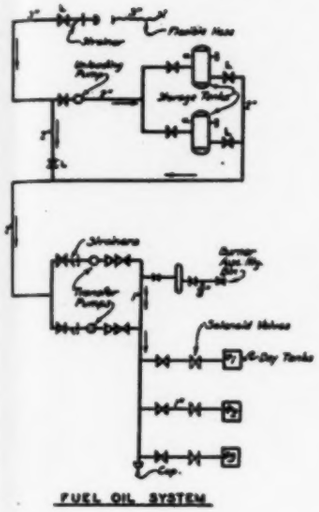


Above view shows the operating ends of the Diesels. Note Manzel force feed lubricators. Below: Clean, simple lines emphasize the compact power plant building.

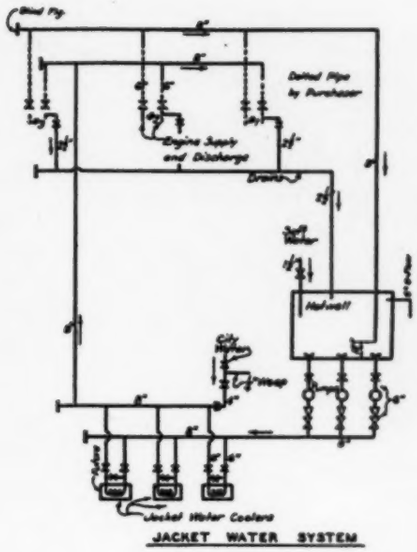


tions. The only type of cooling equipment which met the limitations imposed by this particular case was evaporative coolers.

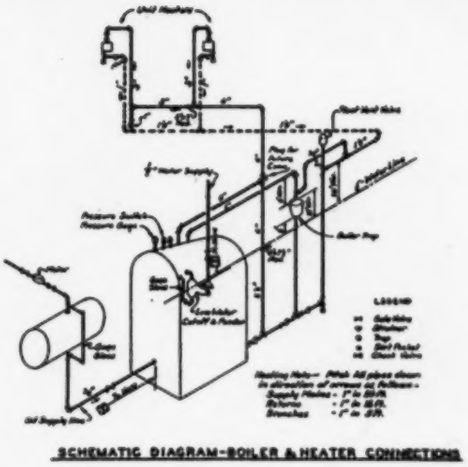
Two coolers were installed in the basement of the power plant building, and space was provided for the installation of a third cooler at a later date. Each cooler has a capacity of 3,000,000 B.t.u. per hour with water entering at 140° and leaving at 120° and with a 70° wet bulb. By making provisions for bypassing part of the jacket water around the cooling coils, and, in addition, making provisions for bypassing a portion of the air discharged from the coolers back into the air intake, the wide variety of climatic conditions encountered at Plattsburg will not vary the temperature of



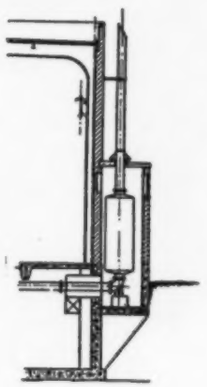
FUEL OIL SYSTEM



JACKET WATER SYSTEM



SCHEMATIC DIAGRAM-BOILER & HEATER CONNECTIONS



the circulating water leaving the engine appreciably.

The evaporative cooler requires the circulation of a large volume of air and a relatively small volume of water over the coils in order for proper cooling to occur. Since provisions must be made for handling large volumes of air, the installation of evaporative coolers within the power plant building permits considerable air conditioning of the building to be accomplished during the summer months.

Cleaning of the intake air for the engines is done with American Cycoil oil bath air filters which, incidentally, do a very effective job of intake silencing on these particular four-stroke cycle engines. Exhaust muffling is done by the use of Burgess exhaust Snubbers.

Heating of the building is accomplished by circulating air around the engine mufflers which are enclosed in brick housings. A forced draft fan of the positive pressure type having a capacity of 3,800 cfm. against a static head of 1 inch of water forces air around the mufflers and out into the engine room. It is driven by a two-speed motor which permits heat recovery from the exhaust silencers at rates as required by the weather condition. In addition, a small oil-fired auxiliary heating boiler has been provided for heating of fuel oil, and for building heating in the event that the plant is shut down for any period of time.

Fuel oil is delivered by rail and stored in two 12,000-gallon steel tanks installed above ground. A 50 gpm. unloading pump, located between the tanks, is employed for transferring oil from the railroad tankers to the bulk storage. Two 10 gpm. pumps are provided for transferring the oil from the bulk storage tanks to a day fuel tank located at the head end of each engine in the basement. Due to insurance restrictions, gravity flow from the bulk storage to the day tanks was not used. The transfer pumps operate automatically. A float switch on each day tank starts either fuel transfer pump and opens the solenoid controlled valve installed in the fuel line to the tank requiring oil. When the desired oil level in the tank has been reached, the float valve shuts down the pump and closes the valve in the fuel line to the tank.

Lubricating oil is conditioned by a Hilco reclaimer, and a lubricating oil storage tank has been provided so that oil reclaiming can be done either continuously or by the batch method. The oil storage tank is provided with two compartments, either of which is of sufficient capacity to take the lubricating oil from one engine.

The plant went into operation in April, 1941, following the acceptance tests on the Diesel generating units. The fuel being used, and which was used during the tests, showed on laboratory analysis to have an API gravity of 30 and a heating value of 19,233 B.t.u. per pound. Test results for the three units were as follows:

Unit	Av. Load Kw.	Btu. per Kwh. Gross	Kwh. per Gallon Gross
1	340	11,200	12.58
	510	10,220	13.72
	690	9,900	14.19
2	360	10,250	13.32
	540	9,580	14.7
	705	9,700	14.5
3	360	10,900	12.88
	550	9,800	14.35
	670	9,710	14.57

The total cost of the power plant was $256,464.19 or an average of $122.13 per kilowatt of installed capacity. Design of the plant as well as the supervision of its construction was handled by Burns & McDonnell Engineering Company.

The new Crawford plant and main store occupies an entire city block and employs 2,200 people.

CRAWFORD USES DIESELS

By WILBUR W. YOUNG

CRAWFORD Clothes, Inc., one of New York's largest manufacturers of men's clothing, now housed in its huge new and very modern factory and main store in Long Island City, made history for progressive production methods as well as for Diesel utility last winter when much depended on completion of the new plant.

It was a foregone conclusion that many processes and operations, also space heating throughout the new Crawford plant would require large quantities of steam and it was therefore natural that the original conception of a suitable power plant should center on two steam generating units, one high pressure and one low pressure, to bleed into the lines requiring high and low pressure steam service respectively. Thus it was that two Murray turbines were selected to drive two Electric Machinery 200 kw. generators, each mounted on a Korfund Balanced Isolator Base. Turbine operation is at 3988 rpm. driving through reduction gears which deliver 1200 rpm. to the generators.

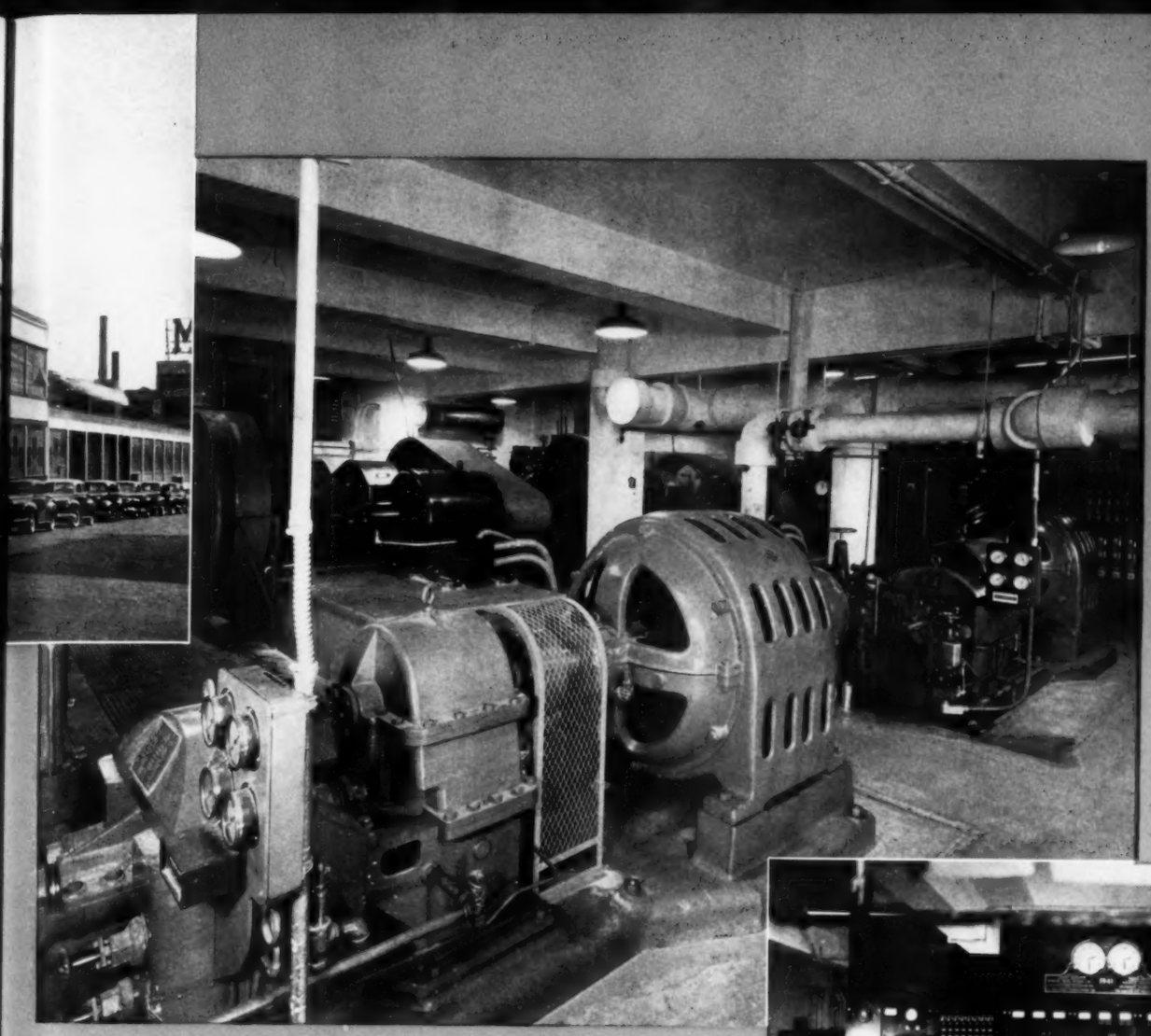
But long before boilers and turbines could be installed and connected, power was needed to light the new plant under construction during the shortest days of the year, and even to operate some phases of clothing production as soon as certain sections of the building were completed. And while the ultimate power plant plans called for a fine heat balance, using both steam and Diesel prime movers, it was during the trying period of construction and coordination that the immediate availability of Diesels was demonstrated. Indeed, the first of two Diesel generating units was started up on January 16, this year, to be followed shortly by the second unit, carrying the load through temporary switchboard and wiring until the first turbine went on the line March 1. Since then, the Diesels have operated an average of nineteen hours a day, five days a week, for long periods of peak demand.

These engines are two Joseph Reid, 2 cylinder, 12½" bore, 16" stroke Diesels, rated 175 hp. at 360 rpm., V-belted to 75 kw. Star alternators operating at 1200 rpm. The two generating units are mounted on a common concrete base which is also isolated from the building structure by Korfund Balanced Isolators. Although horizontal engines are desirable for many installations, they present entirely different isolating problems than vertical units. In addition, the situation at this plant was further complicated by a building column passing through the floating base. Korfund engineers designed the concrete block with sloping ends and installed the entire mass on balanced isolators, which permit extremely accurate loading according to characteristics of the cork panels as well as to the natural frequencies of the Diesels. Results have proven this arrangement satisfactory.

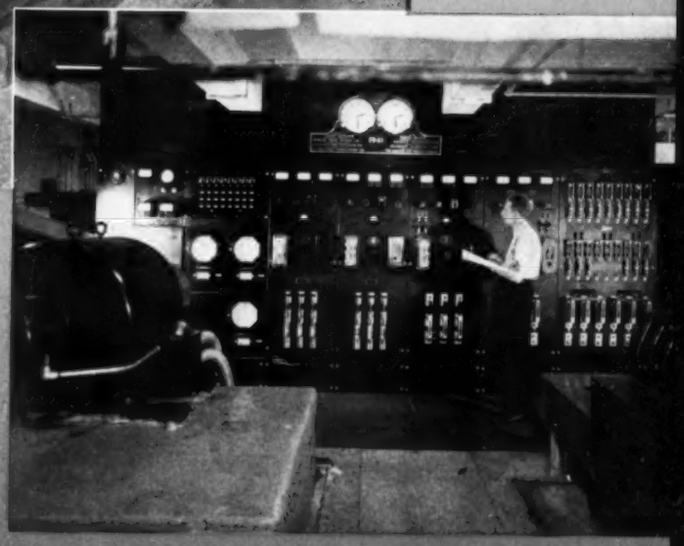
Under the adverse operating conditions existing in the early months and the overloads to which the Diesels are still subjected, it is remarkable that these units have not only stayed on the line but that the overall plant performance, even with one turbine still idle, is showing an operating cost of 50% less than estimated utility cost and monthly operating records show a steady approach to the economy required to meet the projected annual saving of $14,000 which will undoubtedly be realized with completion of the high pressure plant. This, in the light of a typical daily load variation from 40 to 315 kw. with an average daily output of 2500 kwh., is a noteworthy performance.

Largely responsible for bringing this power plant through are the electrical and mechanical engineer of record, Mr. Huxley Madeheim and Norman Schafler, the erecting engineers, Atlantic Heat and Power, Inc., and chief plant engineer, Mr. J. F. MacGowan.

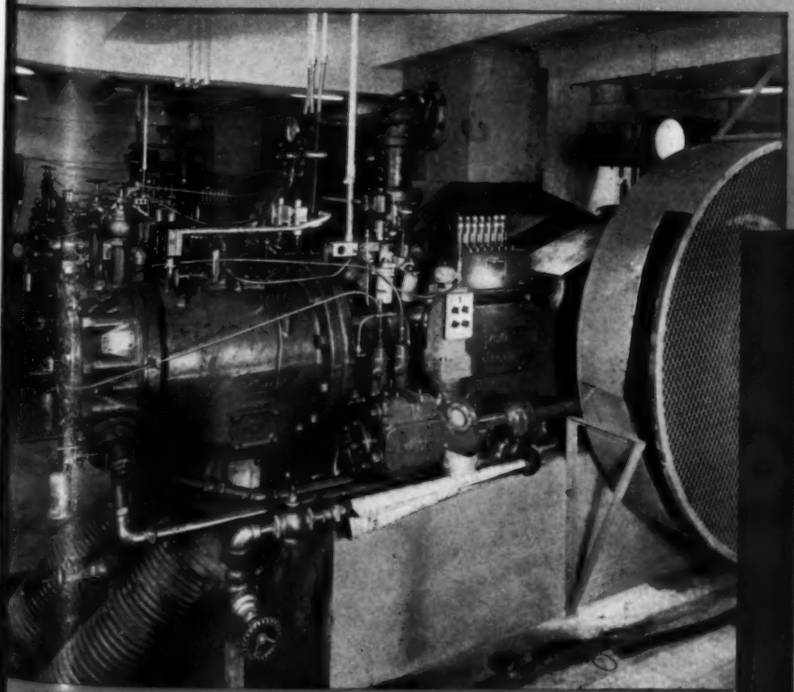
Plant accessories which have given good account are Nugent Duplex fuel oil filters, Socony-Vacuum DTE lube oil, American Bosch fuel injection systems, Manzel force feed lubricators, Buffalo (Niagara) fuel meters and strainers, Coppus intake silencer-filters, Maxim exhaust silencers, Woodward isochronous governors, U. S. jacket water thermometers and Minneapolis-Honeywell safety controls.



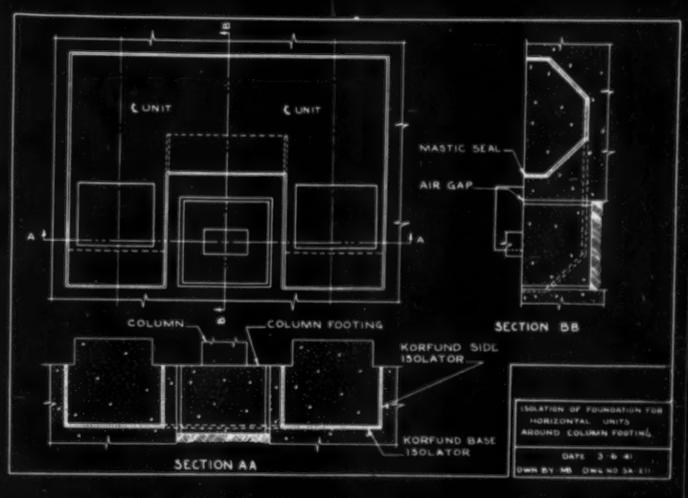
General engine room view showing the two turbine generating units, foreground, switchboard, right rear, and the two Diesel generating units, left rear.



Chief engineer J. F. MacGowan takes readings. This is a Cole Electric board, erected by the Electric Installation Company and fitted with Westinghouse instruments.



Operating side of No. 2 Diesel, showing Woodward governor, Nugent duplex fuel filter, Manzel lubricator and American Bosch fuel injection pumps.



Plan of Korfund isolation for the foundation of the two Diesel generating units.

AMERICAN VOYAGER, new tuna clipper joining the San Diego branch of the Southern California long-range fleet, has already proved an outstanding vessel for the arduous service for which she was designed. She was built, at a cost of $150,000 from the plans of Adolph Larson, naval architect, at the yard of Al Larson Boat Works, Terminal Island. Owners are John and Vincent Tasso. Length is 106 ft., beam, 26 ft. and depth, 13 ft. 5 in.

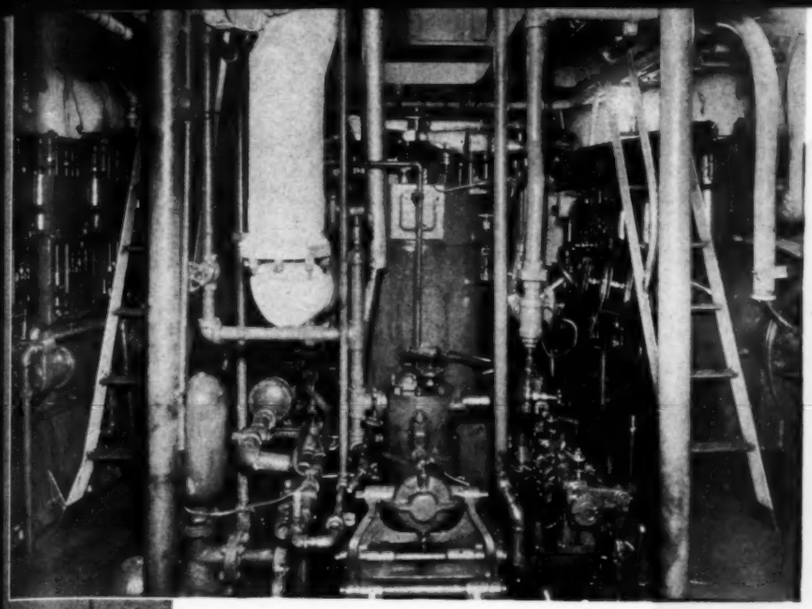
Propulsion is by a 380 hp. 6 cylinder Atlas Imperial Diesel, turning 300 rpm. The engine is direct reversing, driving the propellor by a 6 in. Monel metal shaft. Main auxiliary is a 200 hp. 6 cylinder, 514 rpm. Atlas Imperial Diesel direct connected to a 125 kw. Westinghouse generator. Standby auxiliary is a 70 hp. 4 cylinder Union Diesel, driving a General Electric dynamo.

The clipper is entirely of wood, with the conventional square stern, and semi-clipper bow. The three decks are staggered, the secondary deck reaching back to join the great bait tanks aft, while the control deck extends only to amidships. Trim is of mahogany. Accommodations for a crew of fourteen men are distributed on the second deck, and forward of the upper engine room. Captain's quarters are connected to pilot house, with navigator's and wireless rooms on the deck below.

The refrigeration system is one of the most costly ever installed in a tuna clipper, but the late spring cruise of 117 days, a new long-distance record, with a spread of 91 days between first and last fish caught, proved the investment sound.

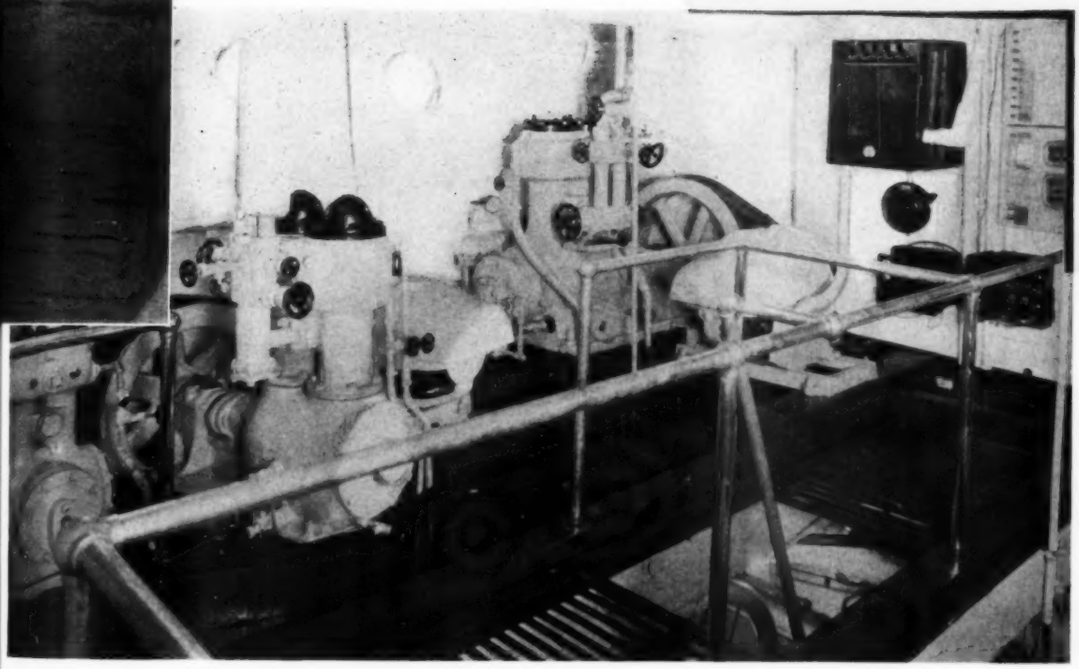
In the holds, when the vessel returned to port, after a voyage to the Galapagos archipelago, Ecuador, were nearly 200 tons of tuna, declared by all who inspected the catch as being practically perfect. Only 1¼ tons was rejected. The system, a complicated three-way operation, was installed by Gay Engineering Corp. There are three large ice machines located in the upper engine room. Two are 6½ by 6½ Vilter single acting, force feed, vertical type, twin cylinder, compressors, driven by 30 hp. 1150/1725 rpm., ball bearing Fairbanks-Morse direct current, compound wound 115 volt motors. Cutler-Hammer manual controls are employed with separate shunt field resisters for speed control with ammeters mounted on the starter. The third Vilter, 5 by 5 is driven by a 15 hp. F-M motor. A utility machine, 2½ by 2½, by a 2 hp. motor has a magnetic C.H. starter for automatic control. All compressors discharge into a common line to individually valved Gay shell and tube marine type condensers. The latter, 800 sq. ft. of surface, are hot dip galvanized after fabrication. A special process protects from rapid corrosion. Condensor pump is a 3 in. F-M delivering 250 gals. of sea water, to start the first phase of refrigeration. "Hot" fish placed in a series of 10 wells and tanks, respond to chilling by the use of a Vilter 4 section Pak-Ice machine, driven by 7½ hp. F-M motor.

This machine delivers slush ice to sea water and brings down body temperature to 28 degrees F., which completes the initial step. This



"AMERICAN VOYAGER"

By A. W. PONSFORD



Upper view shows Atlas main Diesel, center; Atlas 200 hp. Diesel generating set, left; and 70 hp. Union Diesel and G-E generator, right. View left shows compressor units in upper engine room.

liquid is then pumped overboard. Sharp freezing follows, each well having its own circulating system, but nevertheless interconnected. Each auxiliary hold has two 500-gal. centrifugal pumps for circulating dense brine of 23% solution. To start the process of sharp freezing, a reserve of brine, dropped to 10 degrees F. has been prepared in a special steel tank on the main deck, containing a coil bank and having a capacity of 4,000 gals. Saturating with this brine solution for approximately 24 hours reduces the temperature in the well being worked to 14 degrees F. The third phase then goes into operation, that of storing the tuna dry in the wells. Each well is lined with 450 ft. of welded steel coil, spaced evenly, 12 in. centers. With the well pumped dry a second time and "topped" with similarly chilled tuna to fill it, the ammonia coil system is turned on. Gradually the temperature within drops, until—as in the case of the *American Voyager's* 117-day voyage—a low of 14° was reached.

So well did the system operate, augmented by unceasing vigilance on the engineering crew's part, that cannery experts were unable to distinguish between fish caught less than fifteen days from home, and tuna taken in waters 10 degrees warmer, 91 days earlier.

This long trip was noteworthy, not only because of the excellence of fish delivered, but also for the performance of the Atlas Imperial auxiliary Diesel. The engine ran practically non-stop for 2,280 hours and it was this outstanding job which was credited with saving the load. It was turned at a steady 420 rpm., the Westinghouse generator delivering a 700 amp. load.

Bait pumps on the clipper are two 12 in. suction, Campbell Machine Co. vertical type, driven by 30 hp. motors mounted on top for conservation of space. The general service 2½ in. Byron Jackson pump has a 3 hp. motor. Fuel capacity is 22,000 gals., with steel tanks for 800 gals. lube oil, and more than a thousand gal. fresh water.

DENTON, TEXAS

By ORVILLE ADAMS

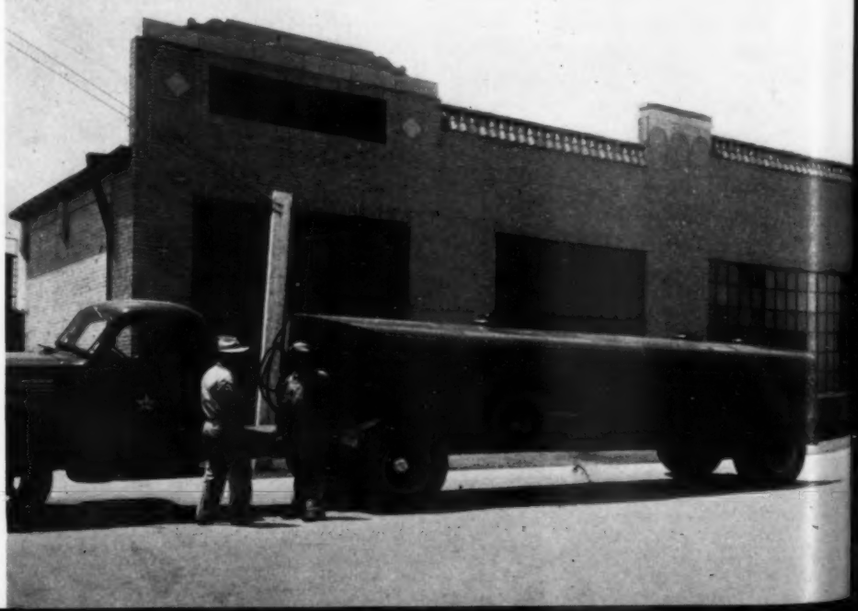
AT the Denton, Texas, Municipal plant, the installation of a De La Vergne Diesel engine rated at 1000 hp. was completed during the summer of this year. This is the sixth 1000 hp. 8 cylinder Diesel engine to be installed in this plant since 1930. Prior to that time, the plant comprised six natural gas, spark ignition heavy duty engines totalling 1550 hp. and generating about 3,000,000 kwh. annually. The present output nears 10,000,000 kwh. with a considerable industrial load still available should the plant be expanded to take on this additional load. The growth and development of the Denton plant has been outstanding, attended by sound engineering and management. Every auxiliary essential to efficient operation has been added with each new engine. Fifteen years of gas engine operation plus more than ten years of Diesel operation has given the city and its engineers a wealth of experience. The result is that Denton serves as a yard stick in these parts for measuring the many factors that are related to municipal power plant administration and operation.

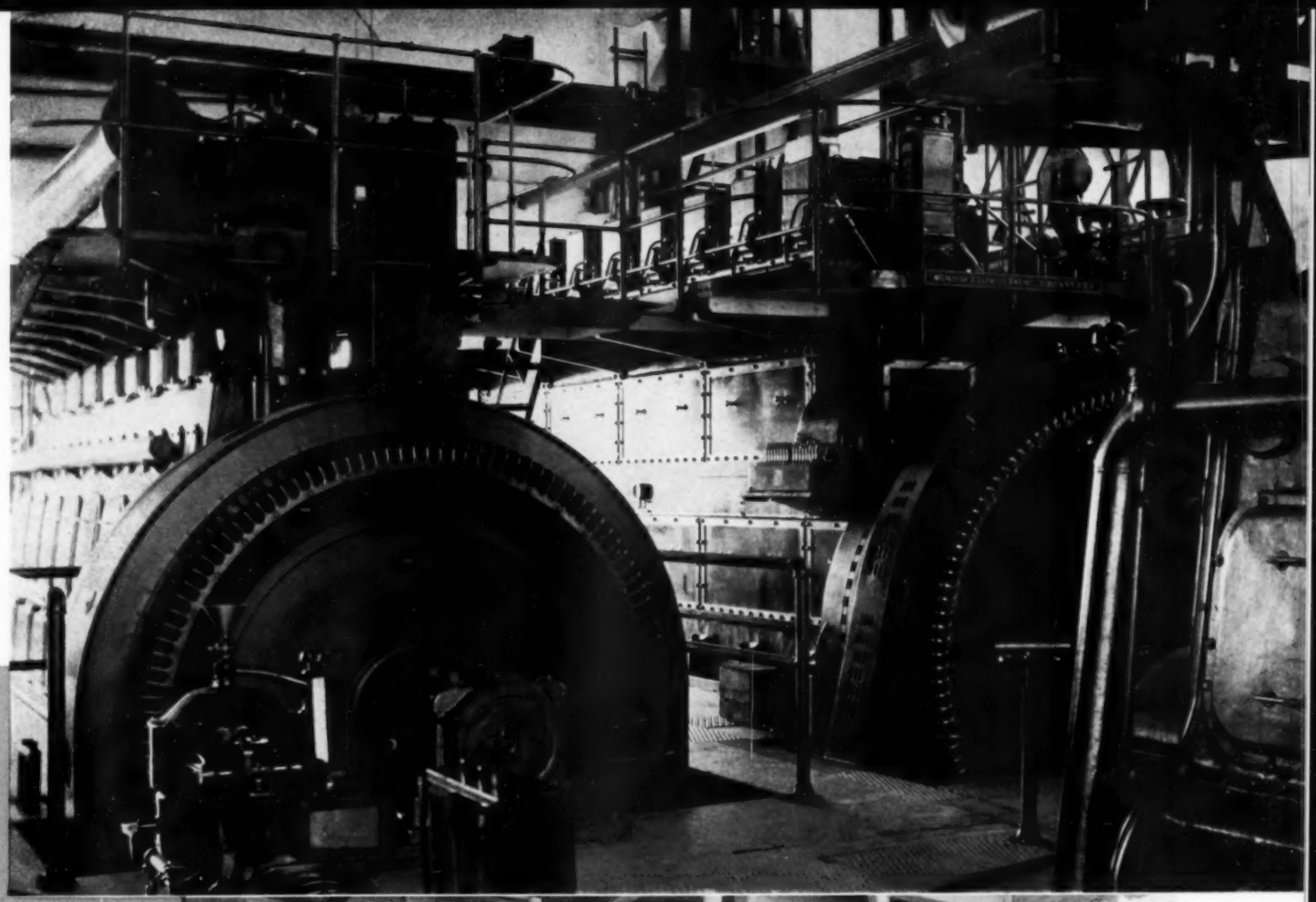
Diesels in the Denton plant include a McIntosh & Seymour 800 hp. engine installed in 1930; a 1000 hp. McIntosh & Seymour installed in 1933; a De La Vergne 1000 hp. unit installed in 1936; another McIntosh & Seymour 1000 hp. and a De La Vergne 1000 unit, both installed in 1937. The new De La Vergne is the third engine of this make to be installed. The new unit is a 16″ x 20″, solid injection engine operating at 327 rpm. and is direct connected to a Westinghouse alternator rated at 875 kva. or 700 kw. at 8 pf. The exciter is driven off the generator shaft extension by a Diamond chain drive. Other engines in this plant are separately excited by motor generator sets. The new engine is equipped with a Pickering governor, an American intake air filter, an Alnor pyrometer, and a Burgess exhaust snubber. Purolator lube oil filters are engine mounted.

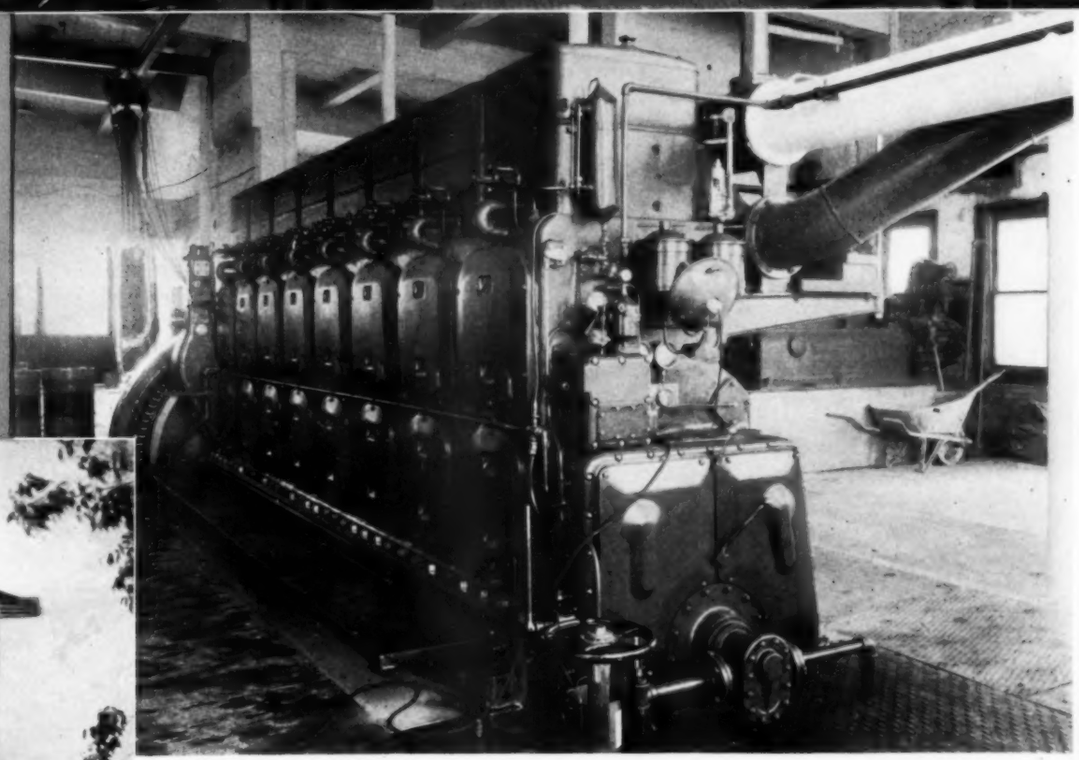
The auxiliary equipment in this plant has not been standardized. Some of these engines are equipped with Maxim silencers, some with Burgess snubbers, while others have silencers made by the engine builder for their own units. In two cases, the air filter units and silencers are mounted on the roof and connect to the engines immediately below by means of vertical risers and flexible connections. This is the case for the engines at the front end of the building. The four engines at the back of the building have silencers and air filter units mounted outside of the power plant building and connected direct to their units by means of straight horizontal headers from the engines. This arrangement has proven more practical, less expensive and somewhat more efficient. Exhaust headers from the engine manifold to the silencers are for the most part heavily insulated to reduce engine room heat and contribute to the general comfort of the operating men. The air filters are all of the American type, and these units operate on the adhesive impingement principle.

The handling of lubricating oil in this plant is interesting. Each engine has its individual De Laval centrifuge for oil purifying and all the lubricant in the crankcase is continuously centrifuged. Likewise, all fuel oil is passed through a centrifuge for purifying before being pumped to the overhead day supply tanks mounted on the engine room wall.

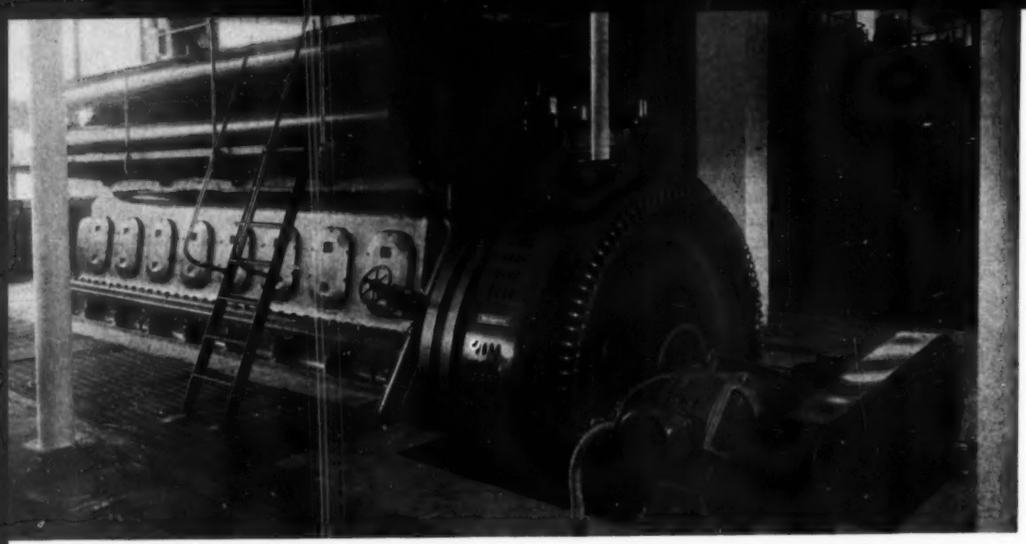
All the oil is regularly batch-cleaned by a Youngstown-Miller reclaimer, a new and larger unit of this make having recently replaced a smaller unit installed some years ago. No oil in this plant is ever wasted, for the reclaiming process, together with continuous centrifuging, makes it possible to continue to oil in use indefinitely, make-up oil being sufficient to maintain viscosity within the required range. The cost of lubrication in this plant is unbelievably low. Double Seal piston rings are used on all engines, according to Mr. Cartwright. He made a study of cylinder liner wear, and found that the present rate of wear for the plant as a whole is less than .001″ per thousand hours of operation. He reports minimum ring replacement, also favorable maintenance and down time for the plant as a whole. Good fuel is







Top view: The two Diesels added to the Denton plant in 1937, a De La Vergne and a McIntosh & Seymour, both rated 1000 hp. Above: The 1000 hp. De La Vergne Diesel engine installed this year. Left: Exterior of the generating plant. One of the City's tank trucks arriving with a load of fuel.



Generator end of the latest unit showing Westinghouse alternator with Diamond Chain exciter drive.

obtainable directly from refineries at Gainesville, about thirty miles away. This fuel is delivered by the city's own oil transportation equipment to the tanks at the power plant. A considerable saving has been effected in this manner, and the cost to the city per gallon is lower than practically any other large user of this class in the region.

The oil reclaimer used in this plant is constantly on the job to reclaim all the crankcase oil. When the colloidal carbon entrained in the lubricating oil has reached a predetermined concentration, the oil is pumped from the crankcase to the dirty oil tanks below the oil reclaimer unit from whence it is pumped to the reclaimer. The method is known as the activated clay method, a process that restores the color and removes acid and all foreign matter, making the oil as good as new and the viscosity slightly higher. Thence the oil is returned to the crankcases of the engines. There are oil lines from each engine to the reclaimer and the oil is transferred by means of suitable oil pumps between the engine and the reclaimer. Each time the oil is reclaimed a certain amount of the reclaimed oil must be removed from the system and new oil added to keep the viscosity at the proper value. This results in the accumulation of a surplus of reclaimed oil, which must be mixed with considerable amount of new oil for use in the engines. Oil that may have been reclaimed too many times actually accumulates and hence is not good for use in the engine without special treatment. The treatment of lube oil in this plant results in large savings in the cost of operation.

The reclaimer is operated at intervals sufficient to care for the reclamation of the oil from the six engines in rotation, the work being carried out whenever an engine is off the line for its rest period. Since it is then possible to filter the entire crankcase oil of any engine, the filtering process does not interfere with the operating routine.

The cost of such filtering is for the most part the cost of the clay for the filter, which is very small, estimated at less than one cent per gallon. The cost of current for holding the temperature of the oil at high temperature while in the filter is not a considerable item, since the current is produced at a low cost. Savings in the cost of lubrication is not the most important result claimed for the use of the reclaimer. Reduced bearing wear, which means reduced maintenance is a larger item and this alone would seem to justify reclaimers. On the other hand, the direct savings represented by the value of the reclaimed oil more than offsets the cost of the equipment in a single year, and the general operating cost is a very small item, since this is a part of the duties of the operating crew.

Denton, Texas, is forty miles north of Dallas, and is recognized as the cultural and educational center of North Texas, where two state colleges, the North Texas Teachers College and the Texas College for Women are located. Augmenting its permanent population of around 12,000 by an additional student population of 5,000, practically the year 'round, the demand for and use of electricity in Denton is constantly increasing to care for the growth of the city's institutions, the schools and rapidly developing local industries, parks and recreational facilities. It has been a problem for the plant to keep pace with this demand.

Good engineering as well as continuous improvements and the addition of modern equipment has been the policy of the city administration. There are six engines of approximately the same cylinder size, speed, bore and stroke, and horsepower, an arrangement that affords remarkable flexibility in maintenance. The load is sufficient to require as many as four engines for the daytime peaks, and on high night peaks, as many as five engines may be operating, although not at full capacity. As an indication of the increasing load, the 1940 production was 9,330,000 kilowatt hours net. For 1938, the total was 8,663,000 kwh., for 1937, the load was 7,248,000, and for 1936, the plant generated 6,500,000 kwh. which was more than double the capacity of the plant and its production for 1933. This indicates that the annual increase in the demand is at about the same ratio for the past ten years; however, it is expected that the rate of increase for the next few years will be considerably accelerated. The general over all efficiency of the plant has been improved as experience indicated many improvements, to the extent that the plant is now better than 20 per cent more efficient than it was five years ago when the various details and developments were started to make it an all-Diesel plant. As a result, the application of many money saving auxiliaries, as well as the training of good operation and maintenance personnel, the present efficiency is around 12½ kwh. per gallon of fuel, and an average of 5000 hp. hours per gallon of lubricating oil, which yields a low operating cost of 3 mills per kilowatt hour at the board.

Much improvement has been made in the plant, where it was worked out by careful study and experiment with different systems of operation, regular testing and careful analysis of records on each unit, under the direction of Mr. W. M. Cartwright, chief engineer of the plant for many years.

The plant's consumption of fuel oil at the present time exceeds 750,000 gallons, generating close to 10,000,000 kwh. The fuel oil used is a blend of gas oil and high boiler oil, and is found to be a satisfactory combination for this plant. Two of the early McIntosh & Seymour engines are the air injection type, previously burned a lower grade of oil, although this is no longer necessary, as the same fuel is provided for all six units.

The power plant building is modern and attractive with ample lighting, both natural and artificial, and is well ventilated by means of exhaust fans, and air conditioning units. As seen in the illustrations, every part of the plant is kept clean and painted, and general high efficiency is indicated.

"STICKING RINGS"

By R. L. GREGORY*

From time to time, this department of DIESEL PROGRESS receives communications from Diesel operating engineers relative to their individual problems. These problems vary as plant equipment and design varies, but occasionally we receive several letters bearing upon the same subject. Where this is the case, it is the desire of this department to discuss such problems in a general way and so far as our space will permit.

SINCE the last issue of DIESEL PROGRESS was published, we have received several letters from engineers in different sections of the country, relative to their troubles with "Sticking Rings" and asking our opinions and recommendations relative to eliminating this difficulty. Trying to determine the cause or to suggest a remedy for this trouble in any individual unit, without having access to that unit, is quite comparable to having a doctor diagnose a patient's illness and prescribing a remedy for symptoms written in, without having access to the patient. It becomes a rather difficult task, to say the least. The doctor might hit upon the cause and prescribe the proper remedy, but it would be a chance hit and wholly unethical, in procedure.

In the problem of "Sticking Rings," however, we have all had some experience at one time or another with such a situation, and there are certain fundamental contributory causes and remedies which are applicable to all Diesel engines. These causes may be legion, and may be found anywhere from the source of fuel supply, lubricant supply, air intake, on through the whole unit to the exhaust muffler. I might go even further in stating that the cause of "Sticking Rings" might be traced to the operating or supervising personnel.

On the face of the matter, this may sound like a ridiculous statement, and some engineer might say, "How could the operating personnel be the cause of the rings sticking in my units?" As a rule, the average Diesel engineer takes a lot of pride in his equipment and plant. He believes in the theory of "Preventive Maintenance," practices it, puts in extra hours to see that it is kept in first-class operating condition, and sees that the plant as a whole is in top shape. But there are exceptions to every rule. Now and then we find a plant wherein certain members of the operating and maintenance personnel adopt the old policy of following the path of least resistance, and letting things go, trusting to luck that things will be all right, until the spirit moves them to do something. When they finally run into difficulties, such as "Sticking Rings," they have a ready alibi: The manufacturer did not furnish them with the proper rings on the last shipment, the lubricant vendor gave them a different oil than they had been using, or the fuel vendor slipped over some bum oil on them. These things can happen and do happen once in a while, possibly not willfully but through error. But had the plant personnel been on its toes, so to speak, these things would have been detected, the trouble averted, and the sticking of the rings would not have occurred. By their own procrastination, they therefore become wholly responsible for a condition which they would like to pass on to some other source. This, of course, is the exception, but you may not have to go far to find occasional exceptions within your own locality and knowledge.

We are all faced with conditions in operating our plants today which are beyond our immediate control. There is a constant change of load conditions due to adding equipment to the load. We are faced with an increasing delay in the procurement of replacement parts and repairs, and when we do secure them, they are often badly machined or fitted, due to the fact that the manufacturer has had to use inferior workmen and help in getting the material out. Changing qualities of fuel and lubricants are encountered and many other such conditions beyond our control are forced upon us. I recently had an engineer tell me that he had been forced to install a centrifuge in his fuel supply line where he had operated for several years without one, his reason being that he was having trouble with foreign substances in the fuel which had never bothered them before. Generally speaking, some abnormal local condition is at fault when rings are found to be stuck. Often this can be traced back to the fitting and adjustment of clearances when new rings are installed. Any ring, regardless of make or manufacture, must be given the proper tolerances, when being installed.

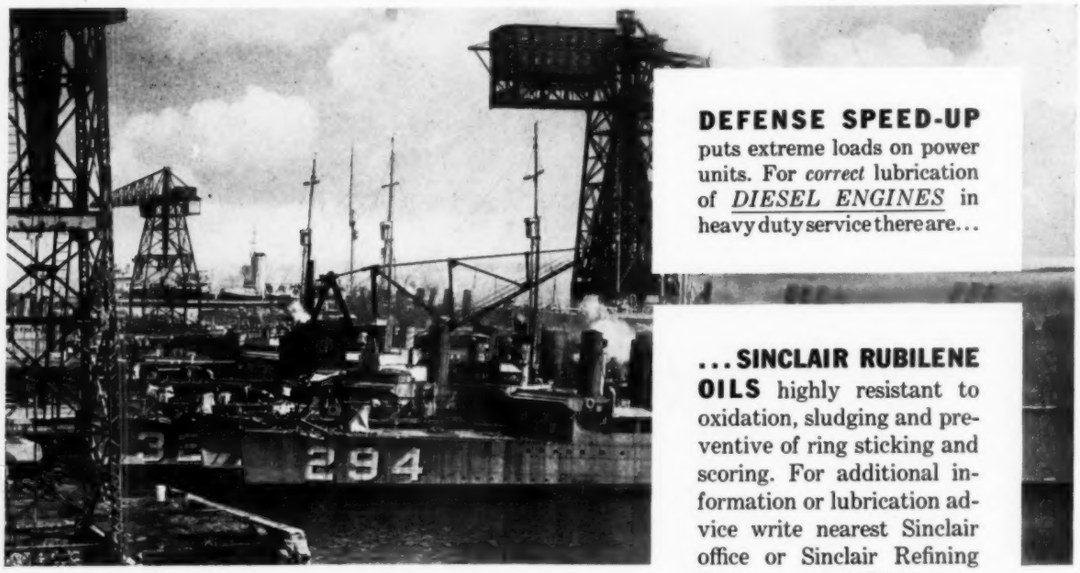
Another contributing factor to "Sticking Rings" is either that of over lubrication or not giving enough lubrication. Many operators get the idea that if a little lubricant is good in eliminating wear, more lubricant is better. This is erroneous from the start, since over lubricating a Diesel is not only expensive, but it sets a foundation for excessive carbonization of the rings and ring grooves, and when this condition arises, it is difficult to prevent "Sticking Rings." The matter of the proper amount of lubricant entails a study of the lubricant itself and can best be solved by using a good lubricant, watching the results by inspection until the happy medium is obtained on the adjustment of the feed. By a happy medium I mean that an engineer should not use so much lubricant that he gets excessive carbonization, and at the same time he does not want to cut the amount of lubricant to a point wherein his film of oil between piston and liner is destroyed and he gets excessive wear.

Over lubrication being one of the main causes of "Sticking Rings," the source of lubrication should be given some attention. In several types of engines, the lubricant enters the bottom of the cylinders by maintaining an oil pressure through a drilled crankshaft. In such cases, the bearing clearances must be watched, since the flow of oil increases with an increase in these clearances. Unless this oil can be controlled to the cylinders, excessive carbonization results, and the only way to control this flow is by maintaining a minimum in the bearing clearances.

Still another factor which must be considered in "Sticking Rings" is that of procuring the proper amount of intake air, and the expulsion of exhaust gases. In order to effect complete combustion, sufficient oxygen must be supplied through the intake air. In order to secure this

. . . . . *And now please turn to page 59*

* *Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.*



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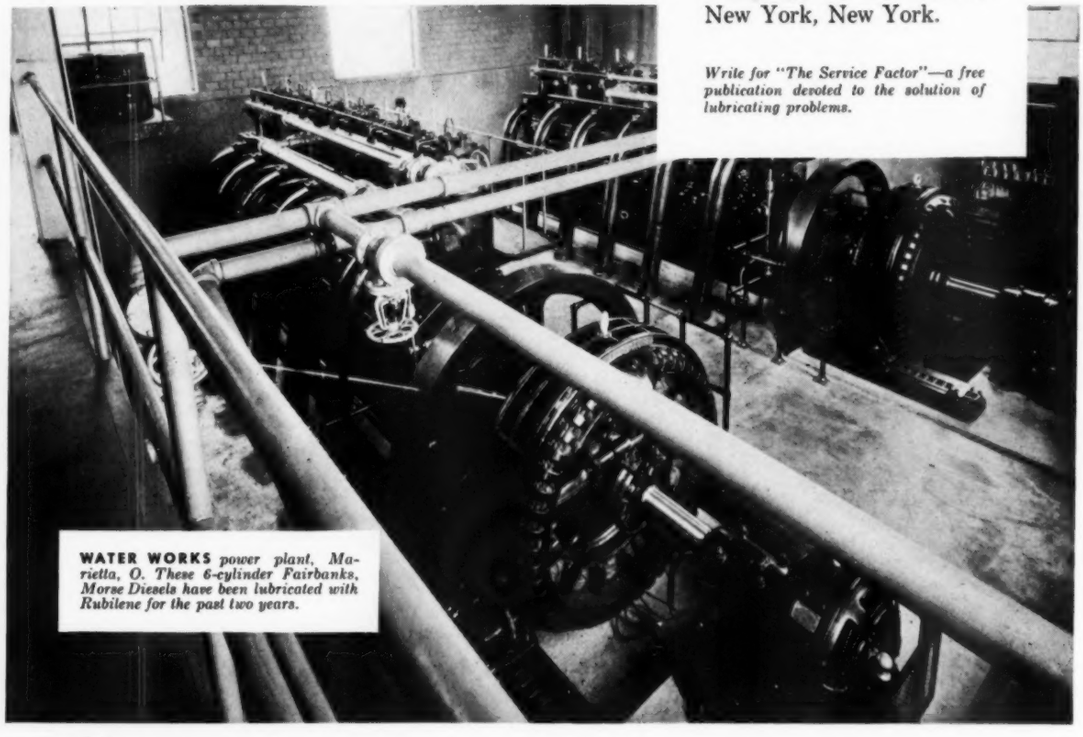

WATER WORKS *power plant, Marietta, O. These 6-cylinder Fairbanks, Morse Diesels have been lubricated with Rubilene for the past two years.*

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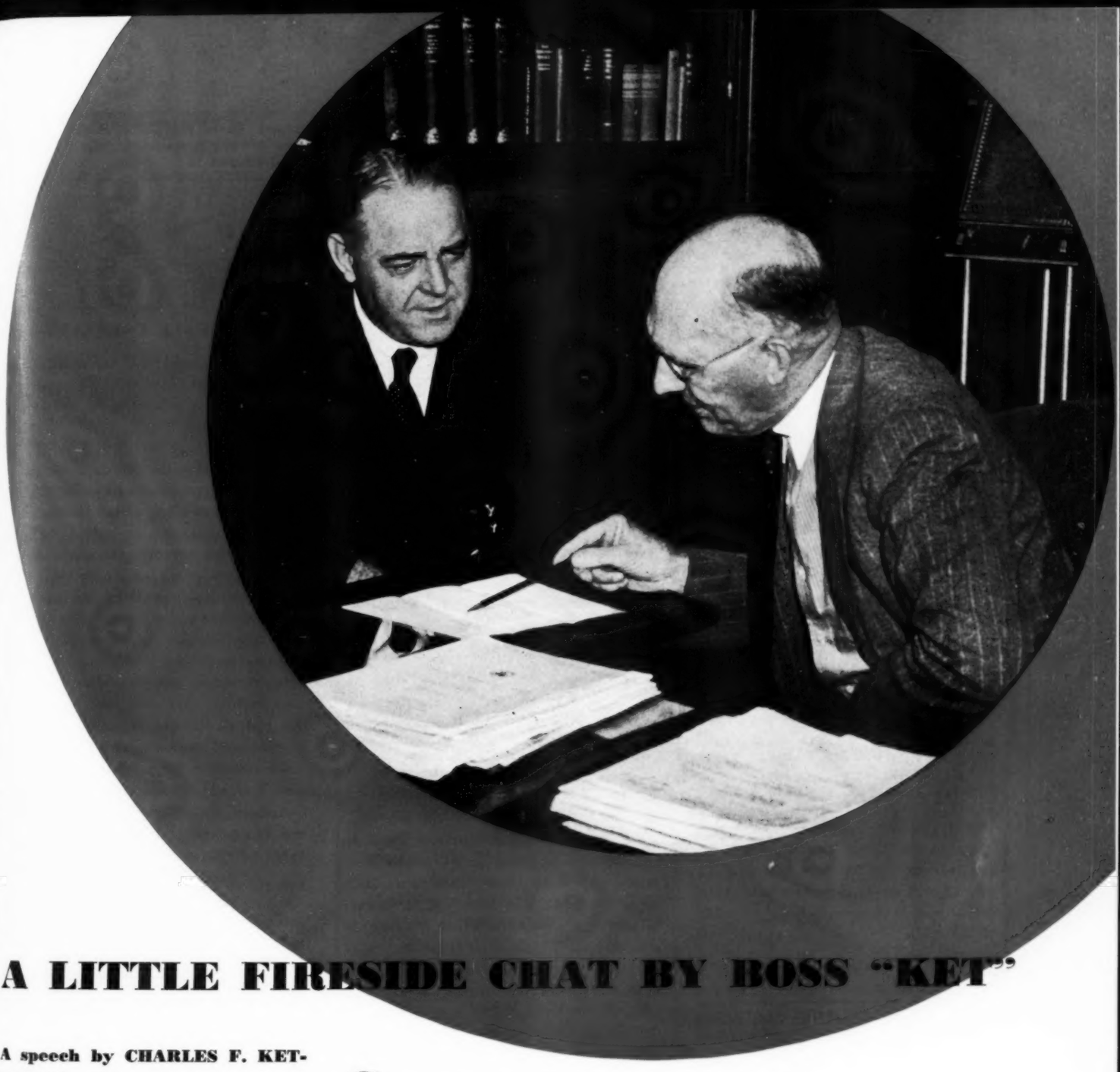


A LITTLE FIRESIDE CHAT BY BOSS "KET"

A speech by CHARLES F. KETTERING, Vice President in Charge of Research of General Motors, July 29, 1941, at the pre-christening luncheon at Hotel Statler, Detroit, tendered by General Motors and the B. & O. to 400 leading business men before inauguration of the first Diesel electric locomotive passenger service on the B. & O. Ambassador run, Detroit-Washington.

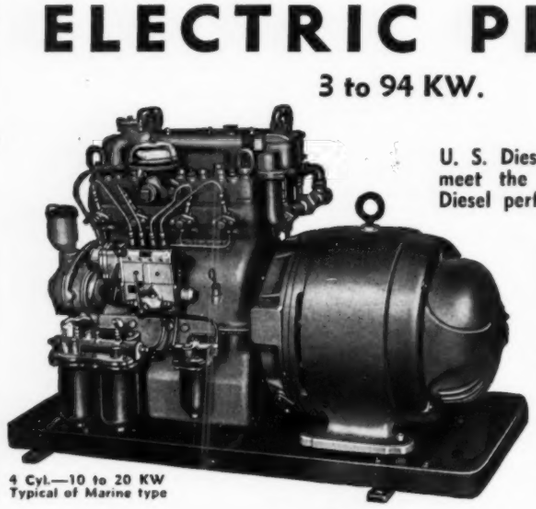
GUESTS, ladies and gentlemen: I am certainly glad to be here. Of course we are, all of us, glad to have one of our new devices brought into any great city, and we have been very cautious about this Detroit situation on account of its being such a dynamic place. In order to be sure that we had it right, we tried it out in 150 other cities first. That, however, is not the fault of the Board of Commerce or anything else. It is force of circumstances entirely beyond the City of Detroit.

Detroit is the home of power. You may not think of it in that way, but in the vicinity of Detroit there is more power produced than all the rest of the world combined. With 30 millions of automobiles on the road, and only rating them at two-thirds of what their advertised horsepower is supposed to be, we have produced 1,500,000,000 horsepower in those 30 million motor cars. The ability to produce power from petroleum products is here in Detroit. We have the engineers, we have all the facilities and everything else.

The development of the Diesel engine, as applied to the railroads, was nothing new at all. In other words, the Diesel engine was 40 years old. All we did was to take hold of the

. . . . . *And now please turn to page 57*

"U.S." DIESEL
ELECTRIC PLANTS
3 to 94 KW.



4 Cyl.—10 to 20 KW
Typical of Marine type

U. S. Diesel Electric Plants are built to meet the highest standards of modern Diesel performance. Safety . . . smooth running . . . easy starting . . . and economical operation — are the *plus values* which you get in a U. S. Diesel Electric Plant. One, two, four and six cylinder models. 3 to 94 KW. Complete lines for both marine and land service. Write for full information.

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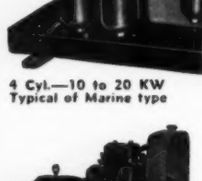


2 Cyl. 5, 7½, 10 KW.

6 Cyl. 25-60 KW.

94 KW.

JOHN THOMAS MOVES UP

JOHN Thomas, the genial and popular Sales Manager of the Diesel Engine Division of American Locomotive Company, Auburn, N. Y., has been moved up—he is now Manager of the Division, with headquarters at Auburn. His many friends in the industry will welcome this well-earned promotion.

Reserve YOUR copy of the new Diesel Engine Catalog. Use the convenient coupon on page twenty-three.

JIM BROCK DIES

JAMES F. Brock, the leading salesman of the New York branch of Fairbanks, Morse & Company, died on August 19 of pneumonia, following a week's illness. Jim Brock has been a pillar of strength in the F-M organization since June of 1925, when he joined the sales force at Norfolk, Va., where his highly successful sales activities have since been centered. We, in this Diesel Industry, will miss Jim Brock—they didn't come any finer.

SMALL BOAT NEWS FROM THE WEST COAST

TWO 132-ft. mine sweepers for the Navy are under construction at Al Larson Boat Works, Terminal Island, California. Main power plants for both boats will be General Motors Diesels. Construction is in charge of Adolph Larson, plant naval architect.

★ ★ ★

THE San Diego Marine Construction Co., San Diego, California, has completed the installation of a 100 hp., 6 cylinder, Lorimer Diesel direct connected to a 75 kw. generator in the 124 ft. tuna clipper, "America."

Another recent installation was a 40 hp. 4 cylinder Caterpillar Diesel with Twin Disc clutch in the fishing boat "Daiho II" for Carl Johnson.

★ ★ ★

WHEELCO EXPANDS

WHEELCO Instruments Company has moved into its own building at Harrison and Peoria Streets, Chicago. In announcing this move, Wheelco states it is the third major expansion made to meet the growth of its business.

Volume Six of the Diesel Engine Catalog came off the press on August 30th. See pages 22 and 23.

NEW FALK COUPLING

THE Falk Corporation has added a new coupling to its line of Steelflex Couplings with the Type P—Piloted Coupling for floating shaft requirements.

This new coupling combines the resiliency and shock cushioning section of the Falk General Duty Steelflex Coupling with a low angle universal joint action, thus eliminating the necessity for an outboard bearing on extended shafts or auxiliary bearings on intermediate shafts. This feature makes possible a large saving in installation cost, space and foundation requirements for auxiliary bearings. The Piloted Coupling also allows greater flexibility in locating the driving and driven units.

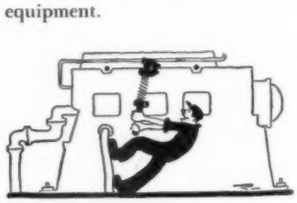
The Falk Piloted Coupling is constructed entirely of steel. It consists of two hubs, one of which carries an integral flange to which the cover is secured, a special tempered steel member forming a complete cylindrical gridmember and flanged steel cover secured to the hub flange with capscrews.

Falk Piloted Couplings are made in three types:

1. Type P—Single Piloted. This coupling will support a long shaft extension without using an inboard bearing on the extended shaft.

2. Type P—Double Piloted Horizontal. This arrangement of two type P couplings with connecting shaft is the ideal coupling arrangement for super calender drives in paper mills, steel mill drives, through motor room walls and marine applications of many types.

3. Type P—Double Piloted Vertical. Consisting of two type P couplings and the connecting shaft, this assembly is ideal on vertical drive requirements where it is desirable to have considerable distance between the driving and driven equipment.



A LITTLE FIRESIDE CHAT

***By* BOSS "KET"**

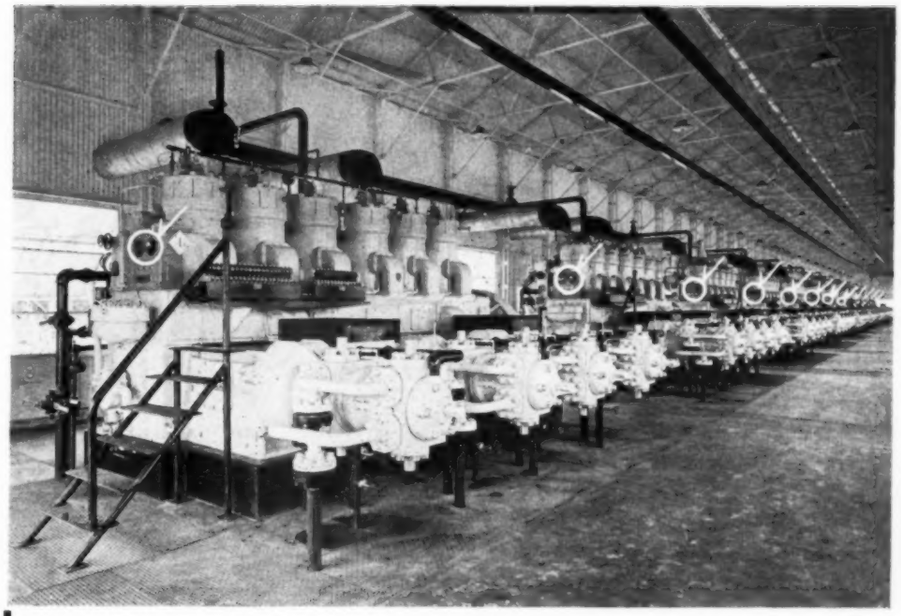
. . . . *Continued from page 55* . . . .

engine, after we had done a lot of work on the thing which you know as Ethyl gas. We said if what we found out in the combustion of gasoline is so, the chances are we can learn something about the Diesel engine so we started a very simple single cylinder engine development to see if we could work out what the relationship of this high compression engine was. Out of that work came this type of engine, a little bit different from the normal type of engine, and that made possible these locomotives.

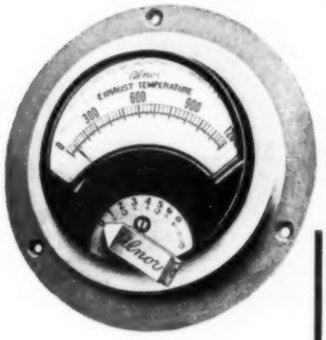
The Electro-Motive Corporation was an existing organization. It had been making rail cars for a great many years and all they needed was something to turn their generators for them to go ahead to this present development. Any contribution we made here at the research laboratories was primarily in the development of a type of Diesel motor, which was quite different. As I said, the Diesel engine was 40 years old. The first 20 years they made them like steam engines. The next 20 years they tried to make them like gasoline engines. All this is is a Diesel engine made like a Diesel engine; it isn't made like anything else.

And so we are glad to be here at this meeting, glad to have all of you men come and see this locomotive. We have a lot of them running. This should really be called an auto electric locomotive, because, after all, it is an electric locomotive that carries its own power house around with it, and the power house is designed particularly for this service and for nothing else. It might be interesting for you to know that it doesn't cost any more to build one of these locomotives than it does to build a locomotive which gets its power from a trolley or third rail. We were told that by the people who made the most of those locomotives. Whether we get more for them or not, I don't know, because I don't know anything about selling or anything like that. In the last year we have stepped out and are building freight locomotives now. The Baltimore & Ohio have cooperated with us both in the passenger work and in the freight work right from the very beginning.

There is one thing I would like to go on record as saying: anybody who says that the railroads are not progressive does not know what he is talking about. We didn't have to sell these locomotives to the railroads. They



THE WORLD'S LARGEST RECYCLING PLANT



at Cotton Valley, Louisiana, is an outstanding example of unification of effort in gas and oil conservation. Seen in the above view are the twelve 600 hp. Clark Super-2-angle gas engine compressor units, ten of which are on pressure maintenance and two operate on recompressor vapors. Twelve "Alnors" of the round flush type, shown right, protect this huge investment.

The most modern equipment and the most advanced methods are used throughout the Cotton Valley recycling plant — in view of which it is only natural that dependable "Alnor" pyrometers were chosen. Protection of these costly compressor units and assurance of continuity of vital pressure maintenance is a job for time-tested, job-proved instruments. The mounting list of such installations establishes "Alnor" pyrometers as the most widely used exhaust temperature indicating instruments in the Diesel and gas engine fields.

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were looking for something of this kind, and it has been the suppliers of the equipment to the railroads, if anybody has been backward, not the railroads themselves.

The Baltimore & Ohio, I believe, bought one of the first locomotives over the telephone, without seeing any specifications at all. In other words, they said, "If you have nerve enough to build these things, we have nerve enough to try them out."

The same thing happened on the freight locomotives. Col. Emerson and his men have worked with us on all that development. As I said, the contribution made by the Research Laboratories here was developing the type of engine, designed to turn a generator. The rest of it is purely electric motive, and, as I said, it ought to be called an auto locomotive rather than a Diesel electric. So, with this, it makes it possible to electrify any place you have a pair of rails.

As to economy, one of the Diesel locomotives, I believe, is equivalent to three or four steam locomotives. While they cost more per unit, they do not cost more per service. Col. Emerson told me just before we sat down to lunch that some of their first Diesel locomotives had run 900,000 miles without going into the so-called back shop, which is quite a record. That is due partially to a well made locomotive, but more particularly to the wonderful maintenance of the Baltimore & Ohio Railroad. It is just like an automobile. You can make it fairly good, but you have to keep it up after you have got it. These records that are being made with these locomotives are extremely spectacular—so spectacular that a great many people will not believe them. Any figures that you see about this are authentic, I am sure.

In opening up this new type of transportation out of Detroit, we feel it is the beginning of another great type of industry. That is, our railroads are so fundamental to the whole of commerce and business of the United States that nothing can ever take their place. Therefore, in giving them this new power and working with them on this new power, you are seeing really the beginnings of an entirely new type of industry.

It is about seven years ago since the first one of these trains was run, and in that seven years the thing has grown tremendously. We have about 500 switch locomotives and about 200 passenger and freight locomotives. Now, in numbers that is small compared to the motor

car, but what it is, and the thing back of it, is that you are going to be able to eliminate the smoke nuisance and that kind of stuff out of all your cities, and the question of electrifying the American railroads is made possible by this simple type of thing.

So we are proud to be part of this celebration today, and we are proud of have the Baltimore & Ohio, the oldest railroad in America, our partners in this presentation here today.

Volume Six of the Diesel Engine Catalog came off the press on August 30th. See pages 22 and 23.

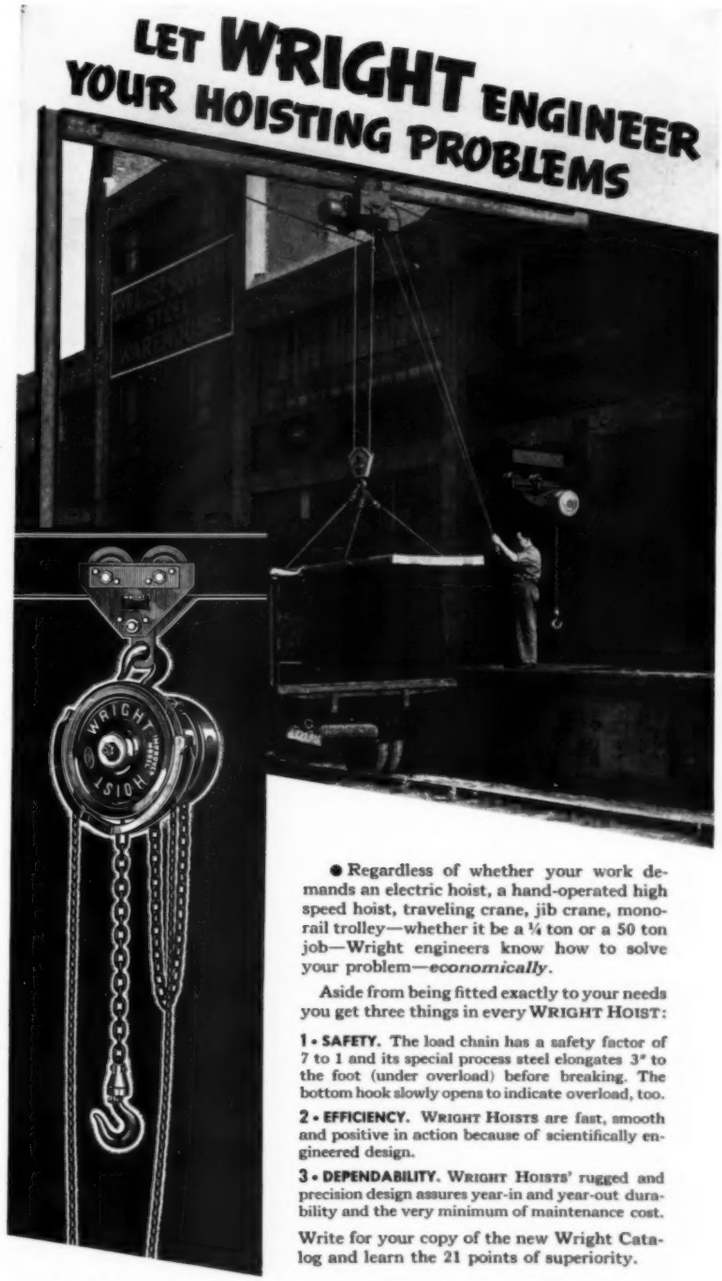
SUPERVISING AND OPERATING ENGINEERS' SECTION

. . . . *Continued from page 53* . . . .

amount all gases must first be expelled. All engines designed with an air intake, should be provided with suitable air filters to remove foreign particles, such as dust, bugs, etc., from the air before it reaches the engine. These should be of sufficient capacity to allow an ample supply of air at all times. They should be inspected periodically and cleaned, thus removing any possibility of restriction in the air flow. The exhaust ports and manifold are of equal import and all restrictions removed to allow for proper expulsion of all gases. A manometer gauge should be standard equipment in all plants for checking these pressures.

There are many other factors vital to the subject of "Sticking Rings" which space does not allow us to present in this article, but which will be taken up in future articles. These, however, are some of the points to be given your consideration, if bothered with this problem.

Three dollars buys the new edition of the Diesel Engine Catalog which went into the mails on August 30th.



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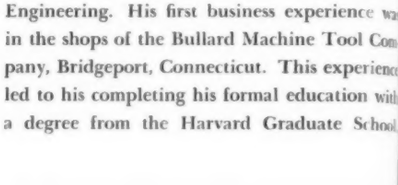
HOWARD M. HUBBARD, NEW ELLIOTT COMPANY PRESIDENT

THE Board of Directors of Elliott Company on August 9 announced the election of Mr. Howard M. Hubbard as President, effective September 1, 1941, taking the place of Mr. Jas. E. Watson whose resignation went into effect July 31, 1941. Mr. Hubbard comes to Elliott Company from the Greenfield Tap and Die Corporation of Greenfield, Massachusetts, where he has been President and General Manager. Previous to his association with that company, Mr. Hubbard served in various executive capacities with the Harris-Seybold-Potter Company of Cleveland, Ohio, one of the country's largest manufacturers of offset printing presses, paper cutting machines and allied machinery.

In 1917, Mr. Hubbard enlisted in the Second Massachusetts Regiment of the National Guard and served on the Mexican border. He later was called for World War duty and served in France with the Yankee Division. He was discharged from the Army in the Spring of 191 as a Second Lieutenant.

Upon his return to America, Mr. Hubbar spent a year at the Massachusetts Institute o Technology and then attended Northeaster University in Boston from which he was gradu ated with a degree of Bachelor of Mechanica Engineering. His first business experience wa in the shops of the Bullard Machine Tool Com pany, Bridgeport, Connecticut. This experienc led to his completing his formal education wit a degree from the Harvard Graduate School



Howard M. Hubbard

In 1930, Mr. Hubbard joined the Harris-Sey bold-Potter Company as Comptroller. Subs quently, he assumed the additional duties o Secretary and Treasurer and when he resigned was also a Director of the Company and Man aging Director of the Company's Seybold and Canadian Divisions. Mr. Hubbard became President of the Greenfield Tap and Die Cor poration about the time the Defense Program started and he was immediately faced with the difficult problem of substantially increasing the Company's facilities. In less than a year, the new buildings were completed and the ma chinery installed and the Company's employee rolls increased from 1,100 to 2,400.

Mr. Hubbard, during his business career, ha established an impressive record in the fields of industrial production, finance, marketing and management. His past experience in the manufacture of engineered products will con tribute to the operations of Elliott Company who are established manufacturers of turbines generators, condensers, centrifugal blowers and other power plant products.

Elliott Company maintains general offices a Jeannette, Pa., also has plants at Jeannette Pa., Ridgway, Pa. and Springfield, Ohio.

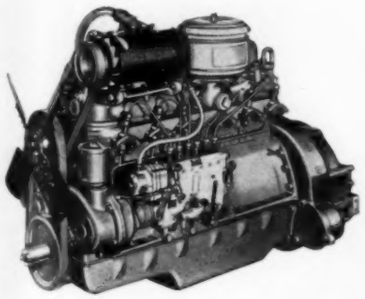
Your Self-Denial...
America's Strength
Since Valley Forge, America's strength has rested in the ready willingness of her people, in every national crisis, to endure personal privation—even hardship—that the nation might prevail and prosper. This holds true in today's emergency . . . Americans must put aside "business as usual" for an "all-out" defense effort . . . *there is not enough of time, materials or men to serve both public and private needs.* In July, 1941, 94% of Cummins Diesel production went—directly or indirectly—to National Defense projects where dependable, low-cost power is an absolute essential. This means you may not be able to get the Cummins Dependable Diesel you wanted this year . . . but, more important, *it means that your self-denial is contributing vitally to America's renewed strength and continued security.* Cummins Engine Co., Columbus, Ind.
ILLUSTRATED: *Model HMR-600 Cummins Dependable Diesel, 150 hp. at 1800 rpm.*
CUMMINS
Dependable
DIESELS

HERCULES SIX-CYLINDER DIESEL ENGINE AVAILABLE FOR FORD AND CHEVROLET 1½-TON TRUCKS

As a further step in developing the market for Hercules Diesel Engines for use in standard 1½-ton Ford and Chevrolet truck chassis, Hercules Motors Corporation now makes available to truck operators and fleet owners a six-cylinder Hercules Diesel Engine in a complete "Power Package." Several thousand of the four-cylinder models have been installed and marked economies have been reported by owners. Both Ford Motor Company and General Motors Overseas Operations are using the four-cylinder unit in Diesel powered chassis for export.

Two sizes of the six-cylinder Diesel are available—for both Ford and Chevrolet Trucks (conventional model only, in each instance)—for the years 1940, 1941 and 1942. The engines are the well-known Hercules Diesel DJX Series of which thousands are in successful operation in trucks, buses and tractors. Fully engineered for application, the engines can be installed by any good mechanic and helper. The sizes of the two engines are Model DJXB, 3½" x 4½", and Model DJXC, 3¾" x 4½". The larger size is for use where operating conditions call for special transmissions, special axles, tires, etc.

Experience with the four-cylinder Power Package Diesel has clearly demonstrated that any competent operator of a gasoline-powered truck can easily handle a Diesel equipped Ford or Chevrolet. Gear shifting is unchanged. The engine is started electrically. Speed is controlled by a foot accelerator. A slight pull on the handle on the dash stops the engine.



Hercules Diesel for Chevrolet Truck

In addition to the very important fuel economies made possible through Diesel operation, owners report less frequent gear shifting and an abundance of "lugging power" when needed, due, of course, to the excellent torque characteristics of the modern Diesel engine. Reduction of fire hazard and increased operating radius of the Diesel-equipped vehicle—with no greater tankage capacity—are most advantageous.

The six-cylinder engines will be marketed through the Hercules distributor organization originally organized to handle the distribution of the four-cylinder Hercules Diesel Power Package units—as well as through Ford and Chevrolet dealers.

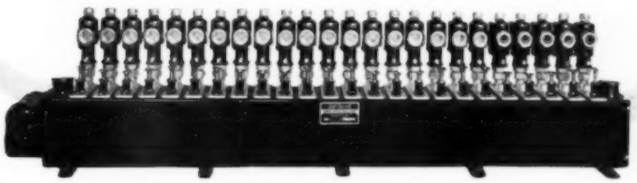
THE keel for the seagoing hopper dredge *Hains* has been laid at the Wilmington, Delaware, yard of the Pusey & Jones Corporation.

This vessel is being built for the United States Engineer. The seagoing hopper dredge *Hoffman* will also be built at this yard. The dredges will measure 215 ft. 10½ in. by 40 ft. by 15.5 ft. and are to be propelled by 950 hp. Diesels.

ANOTHER Recycling Plant

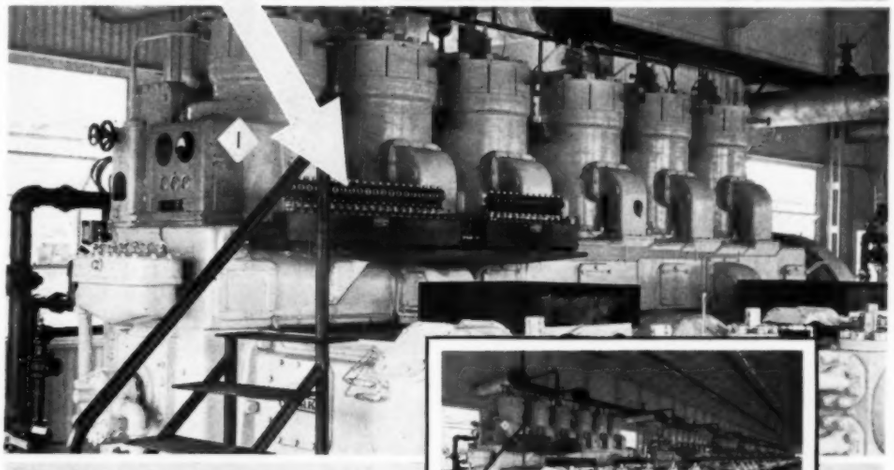
Specifies McCORD

The STANDARD LUBRICATOR of the Oil Fields



The world's largest recycling and natural gasoline plant is completely McCord lubricator equipped like most other recycling plants in the industry.

Many engines and compressors are factory equipped with McCord Lubricators—others come McCord equipped on request. When you order engines or compressors specify McCord by name.



McCORD

RADIATOR & MFG. CO.

DETROIT, MICHIGAN

Lubricator Division

McCord, "Standard Lubricator of the oil field", was specified for equipment on Clark Bros. gas engine driven compressors. Two class "SF" Lubricators, 20 and 12 feed, are used on each unit.

MERCURY, FLUORESCENT LIGHTING SPEEDS DIESEL ENGINE MANUFACTURE AT ENTERPRISE

HIGH-intensity mercury-vapor lamps in latest type high-bay and low-bay reflectors, and what is believed to be the first totally indirect industrial fluorescent lighting installation of its size in the West, are speeding production of Diesel engines in new manufacturing areas, a drafting room and engineering and sales offices recently completed by the Enterprise Engine and Foundry Company, at San Francisco, Calif.

Fifty-four 400-watt high intensity mercury vapor lamps in Westinghouse high-bay Alzak aluminum reflectors with Locklite sockets, are mounted 23 feet above the floor in the main manufacturing aisle. These provide a level of 25 foot-candles of illumination on the work. Hinged dust-tight clear glass covers prevent dust from gathering on reflecting surfaces. Lighting units are mounted in three parallel rows on 15- by 16-foot centers. The area measures 50 by 260 feet.

Adjoining areas, in which machining is done, as illuminated by 250-watt high intensity-mercury vapor lamps in Westinghouse low-bay dome reflectors mounted 10 feet above the floor, on 12½- by 14-foot centers. These provide an average of 25 foot-candles on the work. Reflectors are equipped with dust-tight covers, acid-etched on the inside. Four rows of nine units each illuminate the machine shop, which measures 50 by 130 feet. Seven similar low-bay units are used in an adjoining water test room.

Stroboscopic effect or "flicker" is minimized by the use of three-phase, four-wire, 120-volt lighting circuits which are phased so that adjoining lamps are operated on different phases. Lighting circuits are controlled by Westinghouse multi-breaker panels.

Fluorescent lighting eliminated the necessity for rewiring in space leased in an adjoining building and remodeled to serve as a large drafting room, engineering offices and a sales office. In these areas, a total of 132 inverted open-end industrial fluorescent fixtures provide an average of 31 foot-candles of glareless, evenly distributed light. Each fixture houses two 40-watt 3500-degree white Mazda fluorescent lamps.

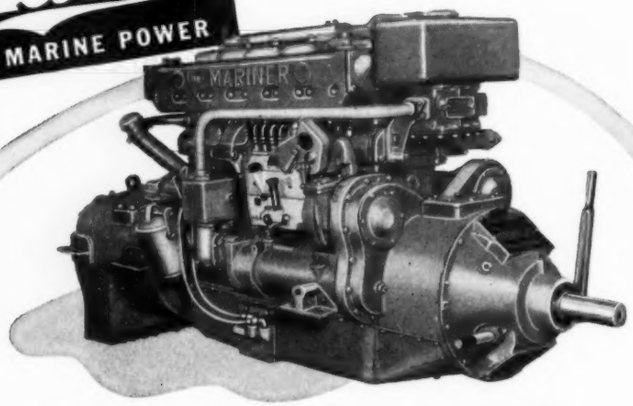
The drafting room, which measures 40 by 70 feet, is lighted by 84 units. Six parallel rows of four units each are mounted in each of three bays, and six rows of two units each in a shorter bay. Inverted fixtures are supported on 2 by 4 timbers suspended from the ceiling by ⅜-inch iron rods. Mounting height is 9 feet. Walls, ceiling and undersides of the fixtures have been painted a flat white. All windows have been heavily frosted to block out daylight.

General engineering office, sales office and chief engineer's office are lighted with similarly inverted units. Direct down-light is provided in a blue-printing room by two similar fixtures, not inverted.

LEFEBVRE TO COOPER-BESSEMER

Gordon Lefebvre is the new General Manager of the Cooper-Bessemer Corporation at Mt. Vernon, Ohio. Mr. Lefebvre was formerly manager of the Diesel Engine Division, American Locomotive Company at Auburn, New York.

Mack
DIESEL MARINE POWER



THE "ALICE MAY" IS STEPPING OUT FOR BIGGER SHARES!

Dragger trawler is repowered with Mack Mariner Diesel for dependable power—lower fuel cost

Mack Mariner Engines range in size from 65 to 100 horsepower—conservatively rated on a continuous duty basis. 4-cycle efficiency. Lanova controlled-combustion assures smooth-flowing, shockless power. Starts in a flash! Direct factory branch service is available for Mack Mariners at 28 tide-water and 14 fresh-water ports. Send a postcard today for complete information on a Mack Mariner for your boat.

MACK MANUFACTURING CORP., MARINE ENGINE DIVISION, LONG ISLAND CITY, N. Y.

"Alice May," 58-foot fishing boat, newly repowered with a Mack Mariner 519-W. 3:1 Twin Disc Reduction Gear—80 to 100 continuous sustained h.p., speeds of 1500-1800 R.P.M. Owned by Caesar Clerc, New Bedford, Mass.

MACK MARINE ENGINES ARE A PRODUCT OF THE BUILDERS OF WORLD-FAMED GASOLINE AND DIESEL-POWERED TRUCKS, BUSES AND FIRE APPARATUS

See pages 22 and 23 for details of the latest and the best book on Diesel Engines.

NEW THERMOCOUPLE CATALOG

A NEW thermocouple data book and catalog which includes descriptions, prices, and recommendations for thermocouple users has just been published by Wheelco. Write direct to Wheelco Instruments Company, Harrison and Peoria Streets, Chicago, Illinois, for Bulletin S2-3.

MACK MARINE DIESELS IN SOUTH AMERICA

THE *Manhattan*, a new 50 foot shallow-draft, tunnel-stern, river towboat, recently placed in service by the Berbice Company, Ltd., of British Guiana, is powered by two 100 hp. Mack Diesel Marine engines. This Mack Diesel Marine powerplant is fitted with 3:1 Twin-Disc reduction gears.

In service 24 hours daily, the *Manhattan* tows one to three steel barges, 120 ft. by 30 ft. x 5½ ft. draft, each carrying 550 tons of Bauxite ore from the mines to the point of shipment 120 miles up the Bernice River, in British Guiana.

Built by the Barbour Metal Boat Works of Valley Park, Missouri, it has accommodations for the crew, consisting of four bunks, dining room, kitchen and wash-room.

Reserve YOUR copy of the new Diesel Engine Catalog. Use the convenient coupon on page twenty-three.

BIDS from nine companies have been submitted to the Maritime Commission for construction of sixteen small coastwise tankers to cost from $494,000 to $994,000 each. Dimensions are: length 220 ft., beam 37 ft., depth 14 ft. 6 in. Each vessel is to be powered with a direct-drive Diesel engine, will have single screw propellers, and a speed of 10½ knots. The capacity of each boat will be 12,000 barrels and all are to be finished within a year.

WEST COAST MARINE NEWS

TWO 4 cylinder Caterpillar marine Diesels, rating 78 hp. each at 950 rpm., were selected to power the new 70-foot passenger and freight vessel, *Uchuck I*, built by the Vancouver Shipyards Ltd., Vancouver, B. C., for Captain Dick Porritt, who will operate on the Barclay Sound-Alberti Canal run. The 38-inch wheels are turned through Twin Disc reverse-reduction gears giving a speed of ten knots. Power takeoff from starboard engine will operate generator. Like her two sister water taxies already in sightseeing service on the bay the San Francisco Water Tour Co.'s *Treasure Island III*, just placed in operation, is powered with a Cummins 6 cylinder Diesel, fresh water cooled by Cummins keel condensors. The 48-foot craft's engines are rubber mounted, shaft is of Tobin bronze with Morse couplings turning 28-inch Hyde wheel, and batteries are Exide. The large wheel is possible through the use of 2-to-1 Twin Disc gears.

YOUNG-HAPPY MASTER COOLERS
for Engine Jacket Water & Natural Gas Cooling in the Oil Fields
MFD. BY YOUNG RADIATOR CO.
SOLD BY THE HAPPY COMPANY
C&NW 4 7773

PRODUCT OF Young
ENGINEERING AND MANUFACTURING SERVICE
SPECIALIZING IN HEAT TRANSFER PRODUCTS

ENGINE JACKET WATER COOLER

These sturdy, compact units are especially built for oil field service and are designed to provide maximum cooling capacity with minimum power consumption. Units are pre-tested and sold on a guaranteed capacity rating.

A FEW OF MANY WELL KNOWN USERS OF YOUNG PRODUCTS

American Locomotive Company
Baldwin Locomotive Works
The Buda Company
Chicago Pneumatic Tool Company
Waukesha Motor Company
Electro-Motive Corporation
Marmon-Herrington Company, Inc.
Le Roi Company
Sullivan Machinery Company
Boeing Aircraft Company
Douglas Aircraft Company, Inc.
Brewster Aeronautical Corporation
The Whitcomb Locomotive Co.

BOUND FOR THE
TEXAS OIL FIELDS

Enroute to the oil fields and for use on the properties of one of the large oil companies near Mission, Texas, this battery of Young-Happy jacket water, oil and gas coolers introduces a new high in cooling efficiency.
Engineered to take care of the cooling needs (jacket water and lubricating oil and the gas between stages) of two 600 HP angle type internal combustion engine compressor units and one 220 HP auxiliary engine, these cooling units embody new refinements that cut power consumption by nearly 50%. It eliminates the open air evaporative method of cooling and solves the serious problem of water scaling so common in this area. Let us apply our complete engineering and manufacturing service to your cooling problems.

YOUNG RADIATOR COMPANY
Dept. 221-F. RACINE, WISCONSIN, U.S.A.

THE HAPPY COMPANY, TULSA, OKLAHOMA
Distributors of Young-Happy Coolers in Mid-Continent Oil Fields
Branches: Seminole, Okla.; Oklahoma City, Okla.; Ellinwood, Kan.; Wichita, Kan.; Salem, Ill.; Odessa, Tex.; Pampa, Tex.; El Dorado, Ark.; Kilgore, Tex.

A. R. FLOURNOY, BELL, CALIFORNIA
Distributors of Young Coolers on Pacific Coast

Young
High Efficiency
HEAT TRANSFER PRODUCTS
UNIT HEATERS • CONVECTORS • CONDENSERS • EVAPORATORS • AIR CONDITIONING UNITS • HEATING COILS • COOLING COILS
Young Quality
OIL COOLERS • GAS, GASOLINE DIESEL ENGINE COOLING RADIATORS • INTERCOOLERS • HEAT EXCHANGERS ENGINE JACKET • WATER COOLERS

A Buda 150 hp. marine Diesel turning a 36-inch wheel through Twin Disc 2-to-1 gears, giving a trial test speed of ten knots, is installed in the new 62-foot cruiser, *Winifred III*, designed by Ed Monk and built by the Grandby Boat Co., Seattle, Wash., for Adolph Schmidt of Olympia. Batteries are by Exide and power takeoffs are provided for 1½ kw. Westinghouse generator and engine room ventilating system: engine controls are by Bendix.

Three dollars buys the new edition of the Diesel Engine Catalog which was put into the mails on August 30th.

SALES of Lorimer Diesels are not confined to the fishing and work boat fleets of the Pacific Coast. A recent shipment of a 100 hp., heavy-duty, direct reversible Diesel was made to a purchaser in Vigo, Spain.

Another recent sale, but much closer home, was that of a Model D3M 45 hp., 3 cylinder, for installation in Captain Charles Graham's 45-ft. hook-and-line boat, "Viv," of San Francisco. A power takeoff is provided to operate a 32-volt Fairbanks-Morse generator.

Volume Six of the Diesel Engine Catalog came off the press on August 30th. See pages 22 and 23.

TWIN DIESEL SPORTFISHER

IF you take the conservative estimate of $100 per individual per year and multiply it by 850,000, you get a rough estimate of the amount of cash money Southern Californians fork over for the pleasurable hard work of catching umpty millions of deep sea game fish. Mind you, this is the sport end of it only; the commercial aspect is entirely ignored in these figures. And bearing in mind that this kind of fishing is done 20 to 40 miles off shore with a couple of hundred fathoms of rough Pacific Ocean under the keel you readily see why this kind of service demands the best in boat construction. As a boat is only as good as its engine, with the fishing season of five months the power plant must be economical as well as dependable; otherwise the operator goes out of business.

To meet this exacting demand the boat operators are steadily swinging to the Diesel. One of the most recent is the partners, R. F. Wilson

81% OF AMERICA'S DIESEL ENGINE BUILDERS PURCHASE ROSS COOLERS

. . . so it's natural that NEW BRITAIN, CONN. INSTALLS A ROSS JACKET WATER COOLER IN ITS NEW MUNICIPAL WATER PLANT

WRITE FOR BULLETINS 4922 and 3622

Only one cooler, Ross Type "CP", is used to maintain the correct jacket water temperature of two Fairbanks-Morse Diesel engines (300 H.P. and 225 H.P.) which furnish current for all light and pumping power in this recently completed water system.

• *Illustration above shows power house exterior. (At left) Partial view of interior showing Ross "CP" Cooler in position.*

DIVISION OF AMERICAN RADIATOR & Standard Sanitary CORPORATION

ROSS HEATER & MFG. COMPANY, INC.
WEST AVENUE NEAR FOREST • BUFFALO, NEW YORK

and C. A. Camp, of Santa Monica, California, who operate a fish camp at Ramirez Cove in the Malibus near Point Dume.

The sportfisher is the 65-ft. *Spitfire,* beam 14′ 5″, draft 4′ 5″, powered with twin HMRS Cummins 6 cylinder, 4⅛″ bore 6″ stroke, 672 cu. in., supercharged Diesels rated 200 hp. each at 1800 rpm. mounted on vibration dampers. Power is transmitted to the 32 by 32 inch special designed three bladed wheels through 2 to 1 Twin Disc gears and flexible couplings by 2½″ bronze shafts. Speed at full throttle is, according to Captain Wilson, full sixteen knots. The engines are fresh water cooled using heat exchangers. The battery system is 17 unit, 32-volt with auxiliary 7 hp. battery charger.

Designed by D. M. Callis, veteran West Coast naval architect, from U. S. Coast Guard specifications as used by Callis in government construction, she is planked with No. 1 1½″ mahogany over 2″ by 2″ on 12″ centers steam bent white oak frames with full length clamps for extra stiffening. Collision bulkhead forward and water tight bulkhead aft combined with government specification slab cork installation gives top rating in safety features. Main and intermediate struts, propellers, and twin rudders are of bronze with lead lined stern bearings.

Controls are centered in pilot house with tiller controls hooked up through hydraulic steerer. Accommodations are for 17 persons divided between fore and after cabins. Each have escape hatches and an automatic sprinkler system is installed over the berths. Some fishermen will smoke in bed. The galley is in the deckhouse and fuel tanks aft below deck.

Two of the oldest sportfishing boat operators on the Southern Coast, Wilson and Camp, formerly operated the *Indiana* and *Dispatch,* also Cummins Diesel engined, out of Ocean Park. Tickets for fishing season of the Wilson-Camp fleet have topped 72,000 and an annual growth is noticeable at all ports.

Items of equipment on *Spitfire,* in addition to the two Cummins Diesels with Twin Disc gears, include: Morflex couplings; Tobin bronze shafts; Coolidge wheels; Atlas hydraulic steerer; tachometer by Stewart-Warner; heat exchanger by Ross; a Witte auxiliary lighting plant.

See pages 22 and 23 for details of the latest and the best book on Diesel Engines.

HYDRAULIC DRIVE BULLETIN

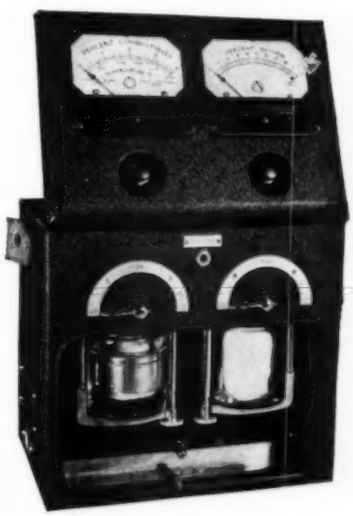
TWIN Disc Clutch Company has just issued Bulletin No. 132 covering its line of hydraulic clutches and hydraulic torque converters for contractors' equipment, marine, logging machinery, locomotive, railcar, and numerous other applications. Most of the bulletins reviewed in these columns lately have been described as colorful and the same may be said of this one. Twenty-three pages of informative illustrations and charts with complete data on how these units work and where and how to use them.

Address your request for a free copy of Bulletin No. 132 to the Hydraulic Division, Twin Disc Clutch Company, Racine, Wisconsin.

Volume Six of the Diesel Engine Catalog came off the press on August 30th. See pages 22 and 23.

Users of

CITIES SERVICE LUBRICANTS get an EXTRA ADVANTAGE!



Heat-Prover Service is now available to users of Cities Service Industrial Fuels and Lubricants. This is an economy measuring service which you can secure in addition to the quality and economy advantages offered by Cities Service's SERVICE PROVED Fuel and Diesel Oils.

The Heat-Prover is an ingenious device—a by-product of our research in metallurgy. It registers continuously and instantaneously changes in the amount of oxygen and combustibles in furnace gases. It is an excellent guide in adjusting 4-cycle Diesels and for combustion control in heat generating plants. In the heat treatment of metals, it is invaluable. It assures uniformity and reduces scrap losses.

Let us tell you how you can secure the use of one of these machines. Mail the coupon today.

CITIES SERVICE DIESEL LUBRICANTS

FREE JUST CLIP AND MAIL

CITIES SERVICE OIL COMPANY
ROOM 1326, SIXTY WALL TOWER, NEW YORK

Please tell me how I can get Heat-Prover Service in my shop. D. P.

Name .....

Name of Shop .....

Address .....

City ..... State .....

WORLD'S GREATEST all around
ELECTRIC TOOL

DRILLS — GRINDS — SANDS

SAWS — POLISHES

SHARPENS — CARVES

ONLY $7.95 POSTPAID
GUARANTEED FOR ONE YEAR

The new WHIZ ELECTRIC TOOL is the handiest power tool ever made. A rugged tool for power and precision work. Drills through ¼ inch iron plate in 42 seconds or engraves intricate designs. Handles any material: Metals — Woods — Alloys — Plastic — Glass — Steel — etc. Saves time. Eliminates labor. Plug into any socket AC or DC, 110 volts. Chuck ¼ inch capacity. Ball bearing thrust. Powerful, triple-geared motor. STANDARD MODEL, with Normal Speed (uses 200 different accessories, instantly interchangeable). **Price only $7.95.**

The only DRILL-TOOL with a full year's guarantee.

FREE Accessory outfit (Value $2) includes set of drills, mounted 1½ inch grinder, sanding discs, cutting wheels, mounted brush, polishing wheel, carving burr, etc. FREE with each tool ordered NOW. We pay postage.

10 Day Trial — Money Back Guarantee

PARAMOUNT PRODUCTS CO.

DEPT. 9-DLR 545 FIFTH AVENUE NEW YORK, N. Y.

COMPRESSOR SELECTOR
Quincy
NEW
FREE
AIR COMPRESSOR SELECTOR
SELECTS CORRECT SIZE AND TYPE AIR COMPRESSOR FOR DIESEL STARTING AND OTHER SERVICES IN ONE MINUTE
This entirely new Compressor Selector works like a slide rule. One simple setting shows correct Compressor Model Number, free air delivery, r.p.m., piston displacement and horsepower motor required. Quick, accurate and dependable. For both air and water cooled compressor applications requiring up to 80 cu. ft. displacement. Pressures covered by the QUINCY Compressor Selector range from 30 to 250 lbs. per sq. in. WRITE TODAY for your FREE Compressor Selector. Supply is limited!
QUINCY COMPRESSOR CO.
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Branch Offices: New York
Chicago • San Francisco
Cleveland • St. Louis

TANKER T. W. DRENNEN LAUNCHED

THE R. T. C. Shipbuilding Corp. of Camden, New Jersey was the scene of a launching on July 19, 1941, which was particularly eventful to the Marine Fraternity.

With present shortage of tank ships, the new addition of the *T. W. Drennen* proved very welcome. It was chiefly the fact, however, that this 260 ft. tanker was named for the Manager of the New York Branch of Fairbanks, Morse & Co. that aroused the special interest accorded the launching.

Reading left to right:—Mrs. T. W. Drennen, Sr., Mr. A. C. Dodge, Vice President, Fairbanks, Morse & Co., Miss L. M. Drennen (Sister of Mr. T. W. Drennen), Miss Marlyn Drennen (Daughter of Mr. T. W. Drennen), Miss Lorraine Drennen (Daughter of Mr. T. W. Drennen)—Sponsor, Mrs. T. W. Drennen, Mr. T. W. Drennen, Mr. Francis S. Bushey, President, Irving S. Bushey & Sons, Inc.

Mr. Drennen's 15 year old daughter, Miss Lorraine Drennen, had the honor of sponsoring the new vessel.

The *T. W. Drennen* has an overall length of 260 ft., beam of 37 ft. and depth of 14 ft. 6 in. and a capacity of 22,000 barrels or 924,000 gallons of oil.

She is powered by a Fairbanks-Morse Model 37, 7-cylinder, 16″ bore x 20″ stroke, direct

FLUID DRIVE

goes to town

One of a series featuring successful applications of Fluid Drive.

● **In industrial plants** —American Blower Fluid Drives are serving many important, widely varied functions — protecting machinery from sudden overloads, permitting use of simple, rugged squirrel cage motors, providing a simple means of variable speed control.

● **In heavy duty trucks** —American Blower Fluid Drives eliminate frequent shifting, make possible better overall truck performance, prevent engine stalling from sudden overload or shock, and prolong the life of the truck.

● **Fan Drive**—American Blower Fluid Drives improve over-all plant efficiency. They permit use of the simple, rugged squirrel cage motors for forced and induced draft fans and provide dependable "stepless" variable speed control to meet varying load demands.

HAVE YOU investigated American Blower Fluid Drive? This revolutionary development, for transmitting power (torque) without any mechanical connection between the engine or motor and drive shaft, has proved practical! Write for data on applying Fluid Drive to your products.

AMERICAN BLOWER

HYDRAULIC COUPLING DIVISION

6000 RUSSELL ST., DETROIT, MICHIGAN

DIVISION OF AMERICAN RADIATOR AND STANDARD SANITARY CORPORATION

reversible Marine Diesel engine rated 1225 hp., 300 rpm.

The tanker will be operated by the Spentonbush Fuel Transportation Service, Inc., New York, and a story covering her equipment will appear in DIESEL PROGRESS shortly after completion.

THE new 103-ft. purse seiner, *Spartan*, recently completed for the Coast Fishing Co., San Pedro, California, is completely powered by Atlas Imperial Diesels. The main Diesel is 400 hp.; the auxiliaries are two 70 hp. driving Vilter compressors, and a one cylinder compressor set for air starting. Generators are General Electric and batteries by Exide.

★ ★ ★ ★ ★

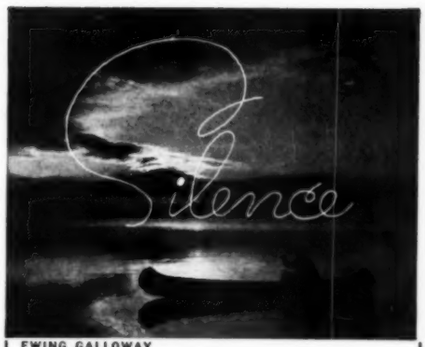
CLARK OPENS A NEW WEST COAST OFFICE

MR. J. B. O'Connor, Vice President of Clark Bros. Co., Inc., Olean, New York, announces the opening of a new West Coast office, which will be in charge of Mr. A. K. Hegeman.

Clark Bros. Co., for the past ten years, has been represented on the West Coast by the Smith-Booth-Usher Company of Los Angeles.
The new sales office and warehouse will be located at the plant of the Pacific Pump Works, Bicket Street & Slauson Avenue, Huntington Park, California. Mr. Art Rowe will be in charge of the service department and a complete stock of repairs will be carried.

★ ★ ★ ★ ★

A CONTRACT has been awarded to the Daschel-Carter Boat Company, Benton Harbor, Michigan, by the U. S. Navy for the construction of two 130 ft. minesweepers, cost of which will be $646,000. These boats are to have wooden hulls, and will be powered with General Motors Diesels.



EWING GALLOWAY

Not many areas are as quiet as this mountain lake 24 hours a day . . . but even in busy cities the noise level often drops to an extremely low point during the early morning hours.

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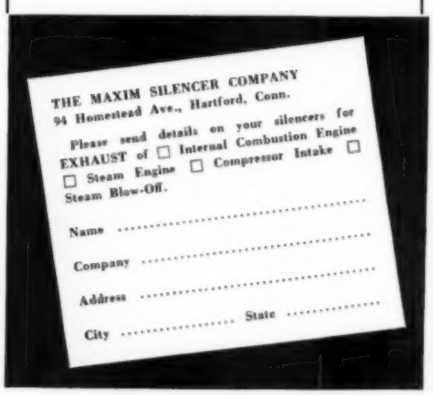
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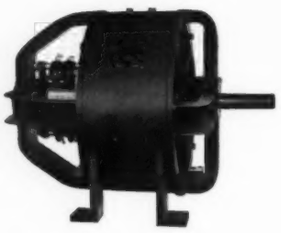


NEW BOOKLET DESCRIBES COUPLED REDUCTION GEARS

A NEW eight page booklet describing coupled reduction gears for driving compressors, line shafts, generators, etc., is announced by Westinghouse Electric and Manufacturing Company.

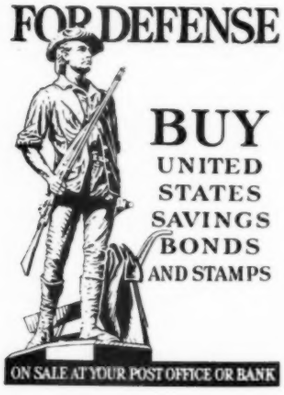
Precision hobbing to give quiet, smooth operation is discussed with a note on the cutting of gear and pinion helices. Features such as 3-point support, even load distribution and forced-feed lubrication are explained and illustrated. Cross-section drawings marked with arrows show position of important parts and give physical dimensions.

A copy of booklet B-2278 may be secured from department 7-N-20, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania.

★ ★ ★ ★ ★

A SELF-propelled mine layer and freight lighter of 250 tons, the *YF286,* was launched on July 11 at the yards of the Sullivan Dry Dock & Repair Corporation, Brooklyn, New York.

This vessel is to be powered with twin screw, 600 hp. Diesel engines, giving her a speed of twelve knots. Installation of the engines and delivery of the boat is to be made within forty-five days. Dimensions are: length 130 ft., beam 30 ft. The cost will be $300,000 and in time of peace, this vessel will be used as a freight lighter.



A CATERPILLAR Diesel Motor D13000, 100 hp. with 2 to 1 Twin Disc reduction-reverse gear is the main power unit in the new 60-ft. boat recently completed by the Astoria Marine Construction Co., Astoria, Oregon, for Captain W. H. White.

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A RECENT sale of a Gray marine Diesel, 100 hp., 4 cylinder, with 3 to 1 reduction gear, was made to the Astoria and Puget Sound Canning Co., for installation in their cannery tender at Excursion Inlet, Alaska.

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DODGE ISSUES MARINE BULLETIN

DODGE Manufacturing Corporation has issued an important and unusually comprehensive bulletin covering its line of marine power transmission equipment. The line includes a full range of pillow blocks and bearings, plain, ring oiling, and anti-friction types from the smallest to the largest; also clutch types and V belt drives for marine applications. The new Bulletin illustrates and describes these products in an attractive, easy-to-read manner and includes installation dimensions with simplified selection tables. A limited supply of this valuable Bulletin is available at no charge to interested readers of DIESEL PROGRESS who write direct to Dodge Manufacturing Corporation, Mishawaka, Indiana, requesting Bulletin A-400.

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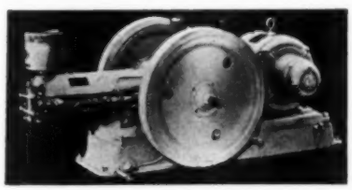

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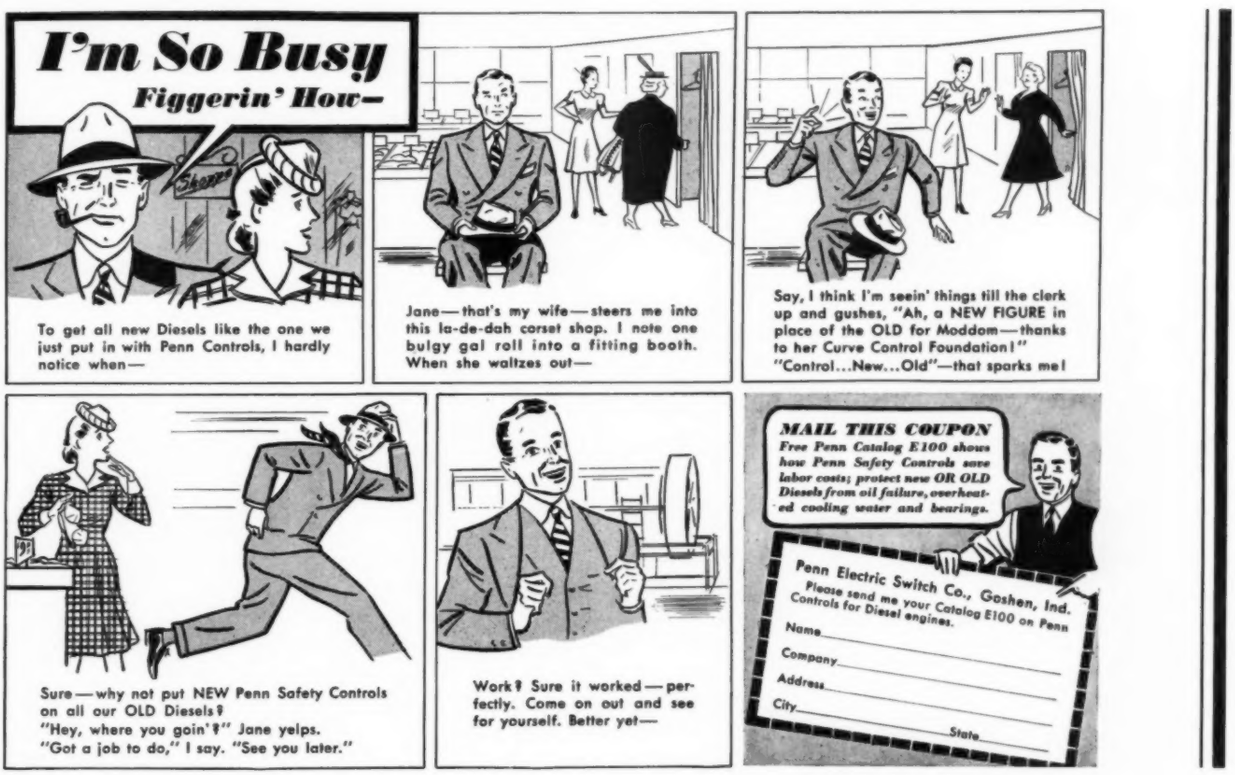
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Latest Diesel Patents

A description of the outstanding patented inventions on Diesel and Diesel accessories as they are granted by the United States Patent Office. This information will be found a handy reference for inventors, engineers, designers and production men in establishing the dates of record, as well as describing the important Diesel inventions.

Conducted by C. CALVERT HINES*

CONTROLLED AIR SUPPLY FOR BUCHI PRESSURE-CHARGED ENGINES

Patent No. 536,295. A. Buchi, Winterthur

The two illustrations herewith are diagrams showing means of controlling the supply of air to engines fitted with the Buchi pressure-charging system. Fig. 1 shows an engine which is supplied with gas and supercharging air, while the engine shown in Fig. 2 with the complete cylinder and piston in section is of the fuel-injection type and the blower, which is not indicated, delivers scavenging air through a control valve (23) to a pipe (14) supplying the engine inlet valve (25). The control valve is opened by a membrane (27) when the exhaust gas pressure in the space (26) is lower than that in the pipe (14). This space (26) is connected to the exhaust gas outlet (29) through a pipe (35). The membrane (27) is loaded by a spring (36).

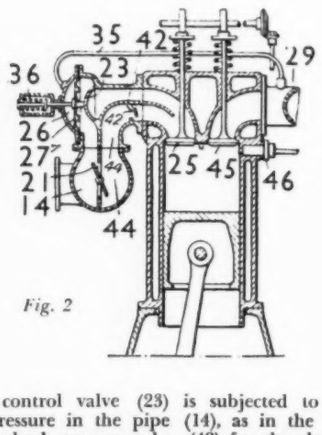

Fig. 2

The control valve (23) is subjected to the air pressure in the pipe (14), as in the case of the back-pressure valve (42) for the charge. For permitting the pressure in the manifold (44) to be adjusted in accordance with the

* Patent Attorney, 811 E Street, N.W., Washington, D. C.

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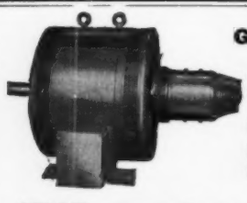

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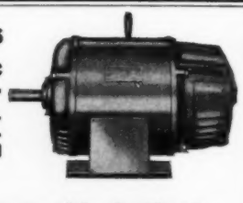

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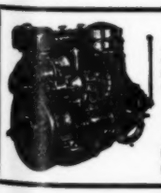

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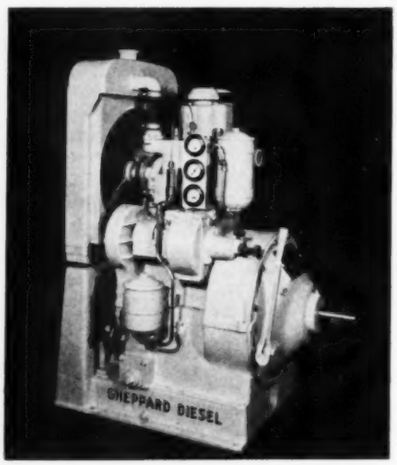

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load and speed of the engine, a regulating valve (21) is arranged between the pipe (14) and the manifold (44). Exhaust takes place through the valve (45) and the fuel injection valve (46) is at the side.

Referring to the diagram of the engine below Fig. 1, there is a blower (48), driven by belt (47), supplying combustion air to a gas producer (50) through a pipe (49). The gas passes through a purifier (51) and a pipe (15) to a passage (24) and thence to the inlet valve (25). A flap valve (22) is arranged in the passage as well as a back-pressure valve (2). The blower (4) shown in dotted lines delivers gas instead of air. The exhaust gas turbo blower (9) supplies air only through a pipe (13).

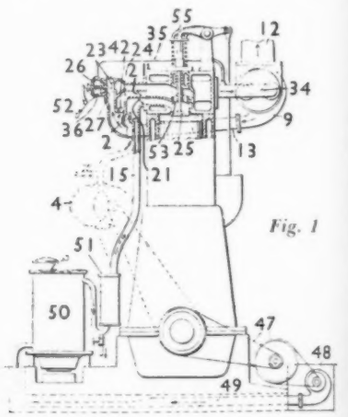

Fig. 1

There is a control valve (23) as with the fuel injection engine. The valve is operated by a plunger (27) loaded by a spring (36) and a lever (52) is provided so that it can be opened or closed by the engine attendant. Part of the air supplied through the pipe (13) reaches the passage (24) through a back-pressure valve (42); the passage leads to the inlet valve (25) and a throttle (21^1) is provided. By adjusting the throttles (21, 21^1) the supply of gas and air can be regulated as regards the production and pressure of gas-air mixture.

The inlet valve (25) has a sleeve (53) actuated by a lever (55) from the camshaft, by means of which additional control is effected. The exhaust gas valve, which is not shown in the diagram, admits gas to the turbo-blower (9) through a pipe (34) and the gas leaves the turbine through a pipe (12) leading to the atmosphere. At the end of the exhaust stroke the scavenging operation begins, initiated by the exhaust gas pressure in the pipe (35) and thus in the space (26). The operation continues so long as the pressure is effective in this respect. When scavenging ends, the valves (42, 2) open, so that through the latter a certain amount of gas enters under a pressure depending on the adjustment of the valve (21). Admission of pure air takes place through the back-pressure valve (42) under the influence of the throttling action of the valve (21^1).

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